AMERICAN GAS JOURNAL

AUGUST 1941

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"... the heat control you can't forget to set!"

"It's a *Robertshaw* heat control — a marvel of streamlined efficiency. You turn on the gas and set the control with one single motion. To turn it off you return the control to zero. Simple? Yes, and *sure*—the only control you *can't* forget to set!"

The simpler the control,
the easier to use,
the quicker to sell!

ROBERTSHAW HEAT CONTROLS

ROBERTSHAW THERMOSTAT COMPANY, YOUNGWOOD, PA.

EMCO

MODERN PRODUCTION METHODS make MODERN PRECISION METERS

General view of assembly and proving line showing moving conveyor belt, assembly jigs and provers. Room is completely air conditioned to assure uniform temperature and humidity.

THE advances made in the last few years in production methods have been applied to the manufacture of EMCO and Ironclad Domestic Gas Meters. Constantly maintained conditions of temperature and humidity throughout both manufacturing and proving operations have been added to accuracy in the machining of parts and precision in assembly. This strict manufacturing control eliminates many uncertainties and variations to assure the maintenance of accurate measurement and the elimination of excessive wear. The result of these advanced EMCO methods is a precise, perfectly fitted meter, capable of a long useful life.

PITTSBURGH EQUITABLE METER COMPANY

MERCO NORDSTROM VALVE COMPANY

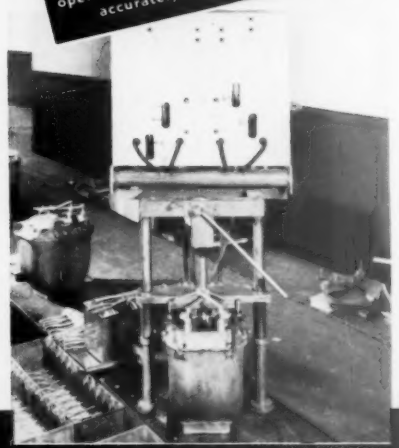
Main Offices, Pittsburgh, Pa

BUFFALO, NEW YORK, BROOKLYN, TULSA, CHICAGO, PHILADELPHIA, LOS ANGELES, SAN FRANCISCO, MEMPHIS, DES MOINES, KANSAS CITY, SEATTLE, HOUSTON, COLUMBIA

Automatic drilling of valve plate. Each operation completes 42 holes in valve plate accurately located by precision jig

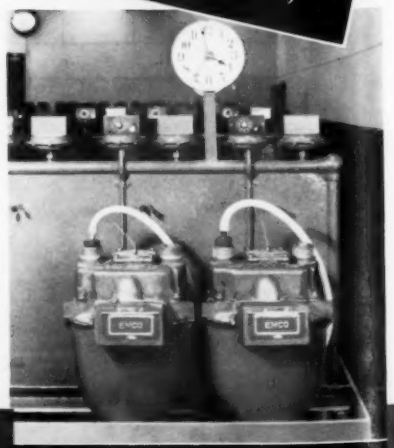
Locating jig to insure proper inter-relation of valve seats and valve guide wire guides with tangent crank and flags

Locating jig assuring accurate positioning of tangent crank during assembly



Test for internal and external leakage in the four measuring compartments in single operation

Automatically controlled proving operation



Automatic simultaneous test for differential pressure and accuracy at low flows

A QUIZ PROGRAM FOR GAS PRODUCTION MEN

What do you know ABOUT CARBURETED WATER GAS MACHINES?

Q. *Can a carbureted water gas machine be operated successfully and efficiently on 100% bituminous coal and 100% heavy oil?*

A. Yes, indeed, if it is a Semet-Solvay REVERSE FLOW Water Gas Machine.

Q. *Does operation on 100% bituminous and 100% heavy oil cause the machine to smoke?*

A. No, indeed, not the Semet-Solvay REVERSE FLOW Water Gas Machine.

Q. *Can a carbureted water gas machine be changed at will, and without alterations in the machine, from coke or anthracite to bituminous coal, and from one grade of oil to another grade?*

A. Yes, indeed, if it is a Semet-Solvay REVERSE FLOW Water Gas Machine. You can take advantage of every change in market prices.

Q. *Is the REVERSE FLOW process new and untried?*

A. No, indeed. The first Semet-Solvay REVERSE FLOW Water Gas Machine was installed in 1937. Today there are ten plants in successful operation and three more under construction. Names gladly furnished on request.

Q. *Can existing water gas machines be modernized to obtain REVERSE FLOW advantages?*

A. Yes, indeed. Semet-Solvay can apply the REVERSE FLOW principle to all three-shell water gas machines.

Q. *Are all Semet-Solvay Water Gas Machines REVERSE FLOW?*

A. No, indeed. Semet-Solvay can furnish all types of water gas machines.

Q. *Are all REVERSE FLOW Water Gas Machines Semet-Solvay Machines?*

A. Yes, indeed. REVERSE FLOW is an exclusive Semet-Solvay development.

Q. *Is it difficult to make sure just what economies and other advantages you can expect from the REVERSE FLOW process in YOUR plant?*

A. No, indeed. Semet-Solvay will be glad to make a survey and complete report without cost or obligation to you. Why not write them today?

SEMET-SOLVAY ENGINEERING CORPORATION

40 Rector Street **New York, N. Y.**

AMERICAN GAS JOURNAL, August, 1941. Vol. 155, No. 2. Published monthly by American Gas Journal, Inc., at 34 North Crystal St., East Stroudsburg, Pa. Executive and Editorial offices at 53 Park Place, New York, N. Y. Entered as second-class matter, October 7, 1928, at the post-office at East Stroudsburg, Pa., under the Act of March 3, 1879. Printed in U. S. A.

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United has experienced plant operators for securing most efficient results.

UNITED ENGINEERS & CONSTRUCTORS INC

NEW YORK PHILADELPHIA CHICAGO

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CABOT GAS CORPORATION
160 SOUTH MAIN STREET
P. O. BOX 372 TELEPHONE 920
WELLSVILLE, NEW YORK

HUGH BURDETTE, SUPERINTENDENT
GEORGE CASH, ASST SUPT

December 14, 1940

Mr. G. M. Kirkpatrick
Blaw-Knox Company
Pittsburgh, Pennsylvania

Dear Mr. Kirkpatrick:

You will no doubt be interested in a few facts concerning our experience in the use of Blaw-Knox gas cleaners.

Prior to the installation of your cleaners on the inlet side of our compressor stations, we encountered a great deal of valve trouble and excessive cylinder wear, caused by Oriskany Sand carried by the gas. This condition proved very annoying and expensive. We also noticed that steel valve guides and valve stems on high pressure regulators 100 miles from the source of gas were completely ruined by sand blasting in 70 days' time.

We have not had the slightest sign of wear resulting from abrasives carried by natural gas since your cleaners were installed at each of our stations. Excessive wear on consumers' equipment has also been eliminated. The elimination of dust complaints by consumers was assured.

Yours very truly,

GODFREY L. CABOT, INC.

George Cash

George Cash

GC/MJ

(Mr. George Cash, Assistant Superintendent of Godfrey L. Cabot, Inc., Wellsville, N. Y.)

The experience of Mr. Cash, as expressed in his letter, is the general experience of users of Blaw-Knox Gas Conditioning. Within a short time, complaints are reduced to inconsequential proportions. And as goodwill is built up, service costs go down —in many cases far more than sufficient to pay for the equipment in a few months. Our Bulletin No. 1578 describes Blaw-Knox Gas Conditioning and its many advantages, explains why leading engineers prefer it. Ask for a copy.

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- Town Border Stations
- Medium and large industrials

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For information regarding type of "K" unit you need, cost and method of operation, please state where to be used, maximum gas volume MCF hour, and maximum and minimum pressure.

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MAKES SATISFIED
CUSTOMERS

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GAS CLEANERS

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based upon FACTS not THEORIES

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It's a fact for example that the new 1941 Universal Alltrol Simmer-Save Burner with its automatic controlled "Boiling" and "Keep Warm" heats brings an entirely new cooking performance to the top of the range. Briefly interpreted, this means better-tasting, vitamin-retained foods plus surprising new savings of time, labor and food.

It's a fact that the Super-Insulated Universal Precision Oven gives uniform heat distribution throughout its entire area—a distribution so perfect that it is possible for the homemaker to bake four cakes or a complete oven meal at one time without the slightest care or attention being necessary. It's "controlled" heat assures perfect, uniform results in every baking or roasting venture. The homemaker is free to do whatever she enjoys most, while her meals cook.

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And—it's a fact that the controlled cooking performance made possible by the modern Universal Gas Range brings actual savings which, when interpreted from the dollar standpoint, more than pay for the range itself.

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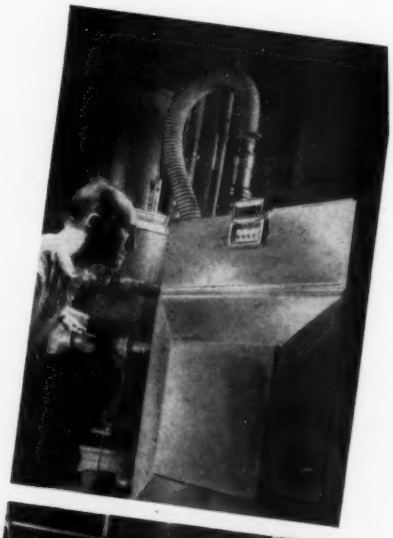

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TINNED STEELCASE METERS

AUGUST
1941

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A New System of Gas House Heating

A Comprehensive Plan and Program for Increased Sales of Gas Service for Heating Homes, Based on a Scientific and Engineering Approach to the Problem

By
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Heating Engineer, New York

In this article the author presents some novel thoughts on the subject of gas house heating. The Journal *has not investigated the merits of the system suggested. However, the plan is presented as of interest to the industry and as worthy of consideration and discussion.*

SPEAKING BRIEFLY, in plain words, this is a method for selling more gas for homes for heating during the winter season.

In order to increase the sale of any service or product, two elements are essential.

1. There must be a definite consumer demand for this product.
2. The price of this product must be within the price range that the consumer deems proper.

Due to the intensive publicity and increased sales effort on the part of the gas utilities, the first condition as stated above has been complied with.

The Trend is to Gas

There is an unmistakable trend and a definite attitude on the part of the public favoring the use of gas service for heating homes.

This is due in part to the work of the gas utilities in exerting sales and publicity to this end, and it is due in part to the wide and extensive introduction of oil burning equipment for heating homes.

That part of the public that has been using oil for heating has become accustomed to the use of automatic machinery in the business of house heating. It not only has become accustomed to this form of heating, but it has been highly delighted with the results achieved.

Having had a taste of automatic heating equipment, it has become more critical of the service and has become educated to demand a still higher standard of performance, such as might be secured with the use of gas instead of oil.

Evidence of this attitude has come to the writer's attention at different times and from separate individuals.

Reference may be made to conversation with three home owners. Each of these had installed oil fuel equipment and was deriving good and satisfactory performance in every instance.

The gist of the talk was substantially as follows:

"I think I made a mistake to put in oil heating equipment. I should have installed gas, for, after all, it appears to be the coming thing in the matter of home heating. No dirt or smudge, no service and no oil to order, and no change in price."

I then asked each why he had put in oil fuel equipment, and the reply from all three was, "I was afraid that the cost of heating with gas would run too high. While I would be ready to pay somewhat more for gas than oil, I had an idea that the difference would be much too great."

From these random conversations, it is evident that,

1. The consumer today is ready and willing to install gas equipment for heating his home.

2. The utilities have done good work in furthering this idea, both through sales promotion and sales publicity.

3. There still remains a real doubt in the minds of many consumers as to the actual difference in the cost of heating with gas as compared with coal or oil.

Therefore our first task, if we are to proceed in a sound and constructive manner to solve this problem, would be to dissipate this doubt as to cost of installation and cost of operation using gas as a home heating fuel.

Future Economies Must Come Through Improved Application

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Photos by Robert Yarnall Richie

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Future Economies Must Come Through Improved Application

While it is true that some utilities have reduced rates on gas used for

heating homes, and that the great increase in business secured has made such reductions worth while, this downward trend is unlikely to continue in the future.

It is my belief that greater sales of gas should be sought mainly by the use of our inventiveness and our imagination, both applied to the reduction in cost of initial equipment installation and in the development of highly efficient means for the utilization of the heat content of the gas fuel that is being used.

And only by a reduction of costs will we be able to increase throughout the country the use of gas for heating our homes.

If today a consumer wishes to use gas for heating and has a limited budget, the procedure commonly followed is to remove the grates from his boiler or hot air furnace, put in a gas conversion unit and insulate the house. This is the cheapest method of introducing gas for house heating. It is at the same time generally the most inefficient method. For every 100 heat units that are metered, and paid for, only about 60 are put to effective use. Of those 60 units, probably 10 are lost in the cellar, so that but 50% of the heating value of the fuel purchased becomes effective. Naturally with a net efficiency of 50%, the cost of gas service will be high. In many instances the consumer prefers to use an oil burner. While this is not so nice and clean and useful, it is cheaper than gas and it will be a long time before the gas company can get this load on the lines.

Most gas companies prefer to sell equipment that has been especially designed for the use of gas and nothing else. The efficiency of such equipment is about 80%. With a loss of 5% in the cellar, this gives a net efficiency of 75% instead of 50%. Thus the cost of gas with this type of installation is much less than where the old boiler equipment is left intact. Naturally, installations of this type have a better chance to survive and to be kept in operation.

Another feature, which discourages the replacement of gas with oil burner equipment in these types of installations is the fact that it is difficult and costly to install oil burning equipment to fire equipment that is specifically designed to burn nothing but gas.

Now, it is my belief, even though much business is being secured in this manner, that in principle, the method of using gas is not sound, nor is it the best engineering practice. In every instance we are taking for granted that the method of applying the heat is standard and first class throughout. It is my opinion that heating with cast iron radiators with steam or hot water, or with a hot air furnace, where the boiler and the furnace are located in the cellar is not the best method of heat generation, distribution and application. By using these methods and systems and firing with gas instead of coal or oil, it is like taking the horse out of the traces and substituting a high powered gasoline engine to pull the buggy along. We are applying a modern high type of fuel to an outdated and out-moded method or methods of heating. Most of us are apparently not aware of the incongruity of the entire procedure. Few have ever challenged our present methods of home heating—in fact few have given the matter any serious thought.

Elements Common to Present Systems

If we examine the different so-called standard methods of supplying heat through steam or hot water or hot air, we find several elements common to all of them.

1. They all require a draft for the combustion of the fuel. This calls for a chimney. For the average home this varies from twenty to thirty feet in height. To obtain this height, and in order that the chimney may not extend too far above the house, the heating unit must be installed in the lowest portion of the house, namely in the cellar.

2. Where coal is employed, a storage space is needed to keep it on hand and to store it. Oftentimes money is saved by purchasing it in the summer, so more space must be allocated for coal storage. Since coal is black and sooty, it must be kept in a separate space, hence the need for a cellar.

3. Coal when fired gives off carbon dust, and ashes when removed from the grates give off fine impalpable dust which travels all over the place and settles on everything in sight and out of sight,—hence the need for a cellar which is apart from any of the finished part of the house or its furnishings.

4. In all of these heating systems, steam, hot water or hot air, the circulation of the heating media is achieved by the difference in weight created by the addition of heat. This causes a rise, and after condensation or cooling, gravity causes the return to the heating container. Therefore the need for locating this equipment in the lowest part of the home, the cellar.

Cellar and Chimney Should be Unnecessary

The use of gas as a fuel, together with the help of electric motor driven appliances, such as blowers or pumps electrically controlled, make it unnecessary for us to use a cellar.

We need no chimney for draft, we have nothing to store, we have no soot, no dust and no ashes. The gas companies store the gas for us, and electric motors will push our heating media up or down or in any direction that we may see fit to send them.

When we make use of gas intelligently, we no longer need a cellar. At least we do not need a cellar for our heating equipment. The owner might like a cellar for a play room or for storage space or for living quarters, but not for a heating system.

The ordinary cellar absorbs heat from the heating systems. Heat that passes through the insulation about the boiler and the piping or the duct work is dissipated in the cellar where in turn it escapes through the floor or the walls, or through some poorly fitted window or opening. Generally, the heat that is scattered throughout the cellar does little to help the heating of the home.

Therefore, when we use gas properly, we do not need a cellar and the cost of the home is reduced by about 30 cents for every cubic foot of space not used.

It will not be necessary to insulate any heating pipes or equipment in the cellar.

No chimney is needed for draft. We therefore can put to our credit the savings effected by not building a chimney and apply the saving to some other item. There are many rules to be observed in the construction of the chimney. There is a saving in the framing of the house, around the chimney, and in the extra flashing work needed where the chimney passes through the roof. Extra repairs are saved by not having any leaks from around the chimney. With gas, we need no chimney.

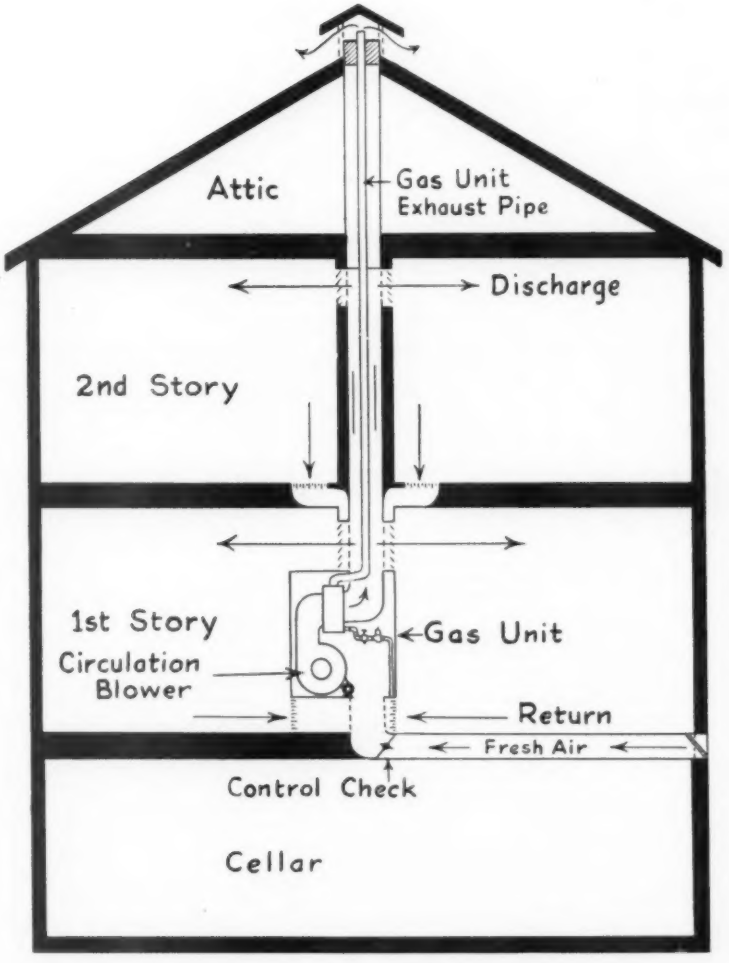
The most efficient gas fired boiler or hot air heater will develop an efficiency of 80% at full load and 5% will be lost in the cellar making a net of 75%. This figure is not bad as far as efficiency is concerned, but there is on the market today a gas fired equipment that

operates at an efficiency of 85%. This equipment is in operation in many industrial establishments and is known as gas fired "unit" heating equipment for heating up large spaces.

The Principle of the Unit Heater and its Application in Dwellings

The "unit" heater consists of a series of vertical tubes, grouped together, the bottom of which are open to gas flames and through which the products of combustion pass. A propeller fan mounted on the framework blows air through these vertical tubes, and thus distributes the heat from the tubes in and around the surrounding area. The products of combustion are carried away, to the outside atmosphere. This equipment is guaranteed to perform with an efficiency of 85%.

It is the writer's contention that this type of equipment is ideal and most adaptable for the purpose of house heating. There is no good reason why this equipment cannot function as efficiently in the home as it does in the industrial field. Instead of using the standard type of propeller fan for the circulation of air, the heating unit would be mounted in a short section of metal duct and a motor driven conoidal blower used for forcing the air out to where we desire it placed.



It is the idea of the writer that this unit be placed in the geometrical center of the house it is to heat. No cellar would be required for this unit. By mounting the heater in the center of the home, any loss of heat through radiation or convection or conduction would be distributed in a useful fashion and it would help heat the home. It would not be wasted, as so much heat now is lost in cellars.

The other advantage of central location is in the reduction of necessary duct work for the hot air supply and the return circulating air.

Units of this type are made with capacities up to 225,000 BTUs. This input is more than sufficient to heat the average home. A unit of this capacity is about 36″ in height, 20″ in width and 10″ in thickness. Should it become necessary to use more heat than this amount, it would be possible to install two heaters or three or four. Above the minimum sizes, the costs of these heaters is in proportion to their output in BTUs.

The blower and motor for driving them occupy a space about 24″ in width, 20″ in height and 36″ in length. This unit should be mounted close to the heater.

The heater and the fan should be mounted in a closet, located in the center of the home. Lining the closet with fire proofing eliminates the fire hazard. An air inlet for combustion and an outlet for the products of combustion are required.

The hot air discharge may be at the four sides of the closet to the adjoining rooms, and the returns may enter the closet from below the floor. The air from the rooms is brought to the heater and in turn sent back into the room with heat added to it.

With a thermostat located in the return stream it is possible to maintain a close regulation in temperature throughout the entire house. Temperature regulation by this means is close, accurate and stable. It cannot fluctuate violently or rapidly.

For those rooms that do not desire heat, the register at the opening of the duct may be cut off at will.

Return ducts may be had by using the space between floor beams. The air will be at a temperature of about 75°F., and no hazard from that temperature has ever been encountered. A certain amount of sheet metal work may be required but that is only a matter of detail.

Use of Circulating System for Summer Cooling

During the summer months, the air may be circulated and kept in motion without using the heater. In this manner there will always be a free circulation of fresh air. Damper arrangements may be such that the air will be pushed out through the attic in the summer time, and the owner will not have to invest extra money in the purchase of a fan to keep the attic free and clear of hot air. Thus the owner will have a cooler house in the hot weather.

For certain rooms such as the kitchen and the bath rooms, there will be no return duct so that all the air will be pushed out of those rooms.

In time to come when the cost of

air conditioning equipment is lower, the fact that air circulating ducts are already in the house will be effective in reducing the first cost of installing cooling equipment.

Cost Comparison

The comparison of costs of a system for gas firing such as I recommend as compared with the standard form of steam heating system is set forth below. Naturally, these figures will vary in different sections of the country, but the relative costs will remain about the same no matter what the first costs may be.

Steam Equipment	
One low pressure boiler 1440 Sq. Ft. (Steam)	$135.00
Piping, radiators, valves and insulation	350.00
Chimney and Breeching	115.00
Oil Burner and tank complete	200.00
Total	$800.00
Direct Fired Gas Equipment	
One 225,000 BTU Duct Heater	$200.00
Blower and fan	75.00
Duct work and registers	150.00
Gas Piping and Electric Wiring	75.00
Total	$500.00
Net Initial saving in first cost	$300.00

This indicates a saving of 37.5% over the cost of an oil fired steam boiler system.

No house with steam radiators located at or in front of the windows can ever maintain as uniform a temperature as a direct fired positive circulation system such as we have indicated.

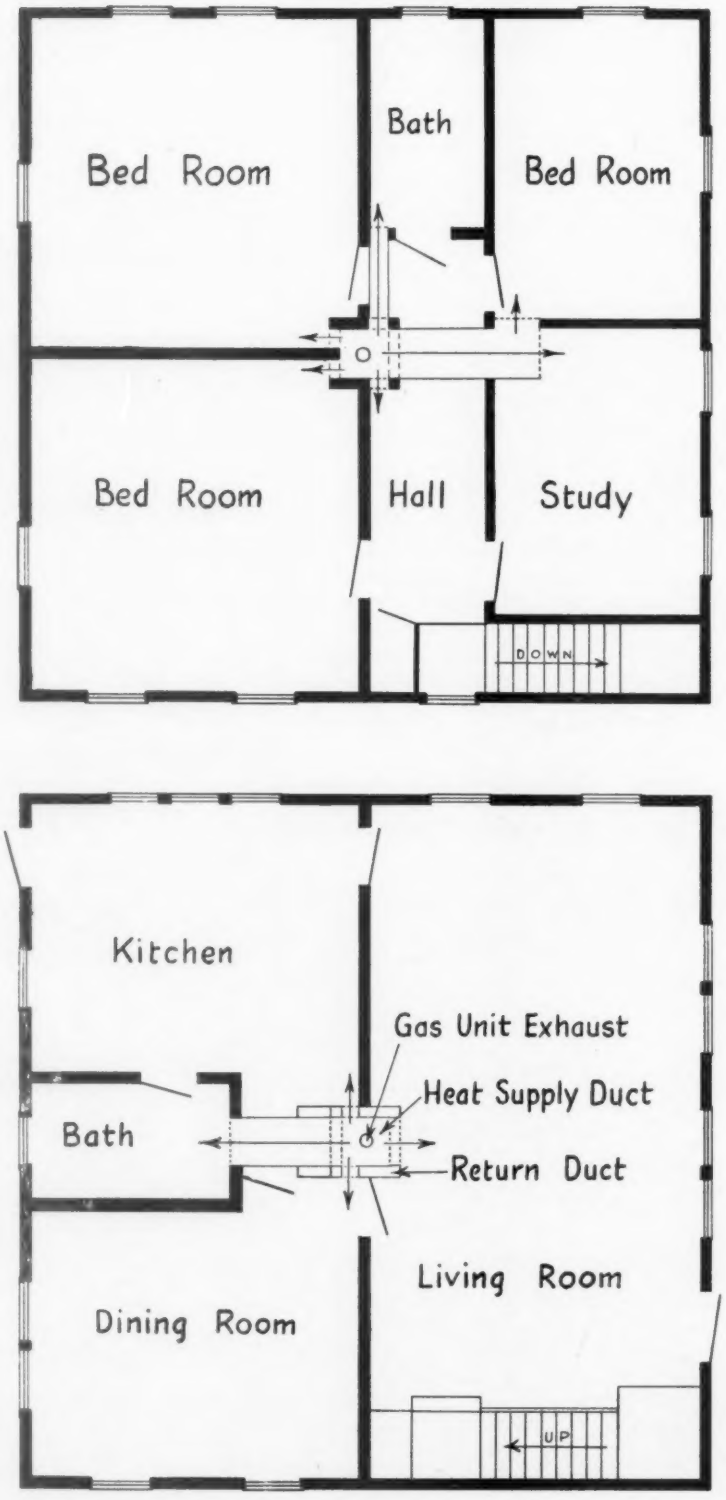
The amount of space now taken up by cast iron radiators where steam is used, is far greater than that space that would be required for the system I have described. The cubic contents of the gas fired heater plus the blower and duct work is less than the amount of space now taken up by the cast iron radiators. The space now used by the radiators in front of windows is of far greater value than the closet space that would be taken up by the gas fired heating equipment.

Apartment House Heating

Having described a means of heating homes in an efficient manner with gas for fuel, there remains another type of home which offers a rich field for the further exploitation of gas as a source of heating. I refer specifically to the ever increasing number of apartment houses that are being erected in towns all over the country.

The standard manner of heating modern apartment houses is with steam or vapor systems from coal or oil fired boilers.

The use of the direct fired gas equipment for heating with a separate heater in each apartment should offer a real advantage to the owner of such property. Each apartment would be heated from a separate gas fired unit heater with its own blower equipment. Since apartments are primarily designed for compactness, there would be a minimum of duct work necessary. Each tenant would be responsible as now to the gas company for the gas used for his range and his refrigerator, and in addition to this for this gas used for heating the apartment he lives in.



As a result of this condition, the apartments would rent for a lower price. Tenants that did not require so much heat would not pay for the wastefulness of other tenants. After all, the landlord includes heat in his rent when he supplies it and each tenant bears an equal share, although he may not use a like or equal amount.

The actual cost of installing the gas fired equipment is less than the cost of an oil fired steam boiler installation. For a fifty family apartment house, which requires a 100 HP boiler, the cost of the chimney, the boiler room and the coal bunker room, the boiler and accessories, piping insulation radiators and valves would total about $12,500.00 or $250.00 per apartment. For a 75,000 BTU gas fired equipment installed, the cost would run about $225.00 or a saving of $25.00 per apartment. This would be equivalent to a ten per cent saving in the cost of the boiler equipment and heating plant.

The landlord would be relieved of a certain amount of responsibility and of the handling of a certain amount of labor and attendance.

A gas rate of 50 cents per thousand would closely approximate the costs of steam, taking all factors into consideration. The manner in which this is arrived at is simple, but too lengthy to be included in this article.

The main fact that I wish to bring out is that here exists a field for the increased sale of gas which may be exploited successfully only when a type of apparatus has been skillfully adapted for this specific purpose and use.

Once again, the installation of ducts together with a positive blowing system makes it possible to secure a certain amount of conditioning of air in the hot weather. This feature would be most certain to be of appeal to many tenants.

As stated before, if it is ever decided to install air cooling equipment, the fact that air circulating systems are in place and in operation will serve to cut down the initial investment cost of such a system at a later date. Should the new system of refrigeration work out successfully using gas heat as the means for refrigeration, as carried out by the Servel Company, there would be no expense for the connection of gas mains, since we will be able to use the gas mains that furnish the gas for heating in the winter time.

We have just completed the description of a gas fired system that operates at an efficiency of 85%, higher than any other now in operation for home heating.

Radiant Heating System

Today, it is possible to heat a home or any building for that matter with gas operating at an efficiency approaching 100%, that is, we use the products of combustion for heating purposes.

I refer specifically to the manner of heating that is known as "Radiant Heating." There have been a number of such installations made recently and the results are being noted with keen interest by the heating industry.

This method of heating is by no means new, for it was practised by the ancient Romans. Many of the old ruins that have been preserved in Rome, show clay ducts where heating was secured by passing the products of combustion of wood fires through them. The heated masonry in turn would give up its heat to the surrounding rooms.

Lately, a number of radiant heating installations have been made in this country where pipes carrying steam are embedded in concrete floors and side walls, and the house is heated by the radiant heat that passes through the pipes into the floors and walls and into the living quarters enclosed by these floors and walls.

From the various reports that have come to the writer's attention, the results seem to have proven satisfactory, and a high degree of comfort is assured at all times under all conditions of outside temperature.

If, instead of using steam or hot water, we use the products of combustion of gas, and recirculate these gases throughout the building in ducts built into the floors and side walls, we shall be making use of all of the heat in the gas we burn.

The ducts would consist of a series of parallel conduits, when concrete is used for the flooring, and would consist of the space between the floor beams for wood construction.

Even if a small amount of these gases escaped into the living quarters, there would be no deleterious effects, for there is no free carbon monoxide in the products of combustion of artificial gas.

To make use of such a system would involve some slight changes in the manner of constructing homes and buildings, but the additional cost of such modifications would not be of sufficient amount to deserve serious attention.

The cost of gas burning equipment for heating a house in this manner is ridiclously low. Nothing is required except a burner. This need not be of any special design, it merely must burn continuously a definite amount of gas. Likewise the blower which is motor driven may be of the simplest type and construction.

Our main consideration would be, as stated before, the proper design and proportioning of the ducts to allow for a minimum amount of friction loss, so that the horsepower demanded for the recirculation of the products of combustion would be at a minimum.

The only connection to the outside atmosphere would be a line to furnish enough air for combustion and a discharge line of equal size to disperse sufficient volume of combustion products to equal the amount of air drawn in for the maintenance of combustion.

Temperature variation would not be rapid in the building, for the contents and the building structure would retain the heat, absorbing it slowly, and by the same token giving it out slowly. For this reason, once the building had reached its proper temperature, the variation of heat would be slow and small over comparatively long periods, its general operation would be steady and uniform.

If the building consisted of a great mass of masonry, it would require a long time for the entire structure to absorb the heat from the circulation of the products of combustion. It would be very much like the old fashioned baker's oven which was built up of thousands of bricks. It would take all of two or three weeks to bring it up to temperature, and if let alone would be four or five months before it became cool once again.

If the building was of light frame construction, it would come up to heat more rapidly and likewise it would lose its heat more rapidly. It would be like the modern type of baking ovens, which consist mostly of light sheet metal and insulation, they heat up quickly under fire, and when the fire is cut off, they cool almost as rapidly.

The method of heating homes by means of the radiant method has many excellent and intriguing features. It permits the full utilization of the entire heat contents of the gas used for firing, and the first cost of equipment is extremely low.

We thus have in combination an ideal couple, low first cost with max-

(Concluded on page 46)

Line 'Em Up Before the Booths and They Are as Good as Sold

That Is One Merchandiser's Experience in Displaying Large Appliances

By
Richard Danfield

THE LARGER and more expensive appliances are not casual over-the-counter transactions or impulse sales. They are the culmination of a number of factors, the greatest, perhaps, being the build-up inside the store. It is a hard job getting the male or the female prospect in that precious spot—and, once there, he or she should be made as susceptible as possible to both visual and talking appeals, all based on sound selling psychology.

In one store which shall be nameless, these larger appliances are displayed in attractive booths along the aisles. Each booth, partitioned with composition board, is tinted in a color blending with the featured appliance.

Most styles in the manufacturer's catalogue are represented. Those numbers the dealer-agent is anxious to push are to be found in booths along the right-hand side. Fast-sellers and popular numbers are grouped in booths at the left-hand side. There's a reason—people tend to move toward the right. Moreover, the finest and most costly model of the entire line is housed in a spotlighted booth.

The enterprising proprietor of this establishment enlightened me as to his methods:

"We all get down fifteen minutes before the store opens every morning. The time is spent in checking over our display sales rooms, as we dub the booth arrangements. The service mechanic, before departing to fix faulty machines at our customers' homes, tests every appliance in the booths to see if they are performing properly. You see, many sales could be lost if a motor wavered or otherwise failed to function perfectly. A prospect will immediately detect a defect and cool off, no matter the explanation we may be able to make.

"We then see that the appliances and equipment are lined up where they should be, and place the chairs in correct positions. I must tell you something about those chairs. Nine times out of ten they do not belong to the booth displayed merchandise, but I have found that when the prospect is comfortably seated, he or she will listen more intently to what the salesman is saying or demonstrating. A *seated* prospect will stay longer than a *standing* prospect, thus allowing more chance of the sales story registering. We always have at least two chairs in a booth, as most times a prospect brings a friend or a relative for company.

"Why I am so darn fussy about these display rooms of ours—which are more than booths—is because I feel it is impolite to ask a prospect to enter one that is disorderly or dirty in appearance. We would not ask our friends to enter our own homes unless we knew they were neat and tidy. These display sales rooms are our reception parlors for the public, and when the prospect enters an attractive and immaculate booth, the mind will react to it and make the sale easier. It also establishes confidence in the prospect's mind that your store is conscientious even to the tiny details.

"We also have an ironclad rule that immediately after a prospect or customer concludes his or her visit, and is escorted to the door, the salesman returns to the booth and does any straightening up or primping that may be necessary. The next prospect is not taken to the *same* booth until we are sure of its perfect condition. This gives, too, other salesmen on the floor their fair and rightful share of prospects as they enter the store.

"A prospect comes inside either through curiosity or to satisfy a need. He or she may know in her mind exactly what she wants, or may have absolutely no intention of buying. It is the salesman's job to find out in a considerate way. The salesman approaches the prospect with a smile. There is something so old-fashioned and so homey in a genuine smile. It also disarms the hard-shelled type of prospect we occasionally encounter. A smile generally signifies that we are pleased to show our merchandise.

"When the prospect is comfortably seated, the salesman endeavors to obtain her name as soon as possible. It is far more friendly to be able to address her as 'Mrs. Brown' than 'Madam this' and 'Madam that.' She was under a certain strain as she entered the store, for she had taken considerable time to decide that this was the month in which she should look at a certain appliance. She had also talked over the matter with her husband, who felt as she did that she must get the best possible value for the money. To her it is more than an ordinary purchase, so the salesman tries from the start to instill in her a friendly and trustful feeling—one which will eventually cause her to rely a lot on the salesman's judgment as to the appliance best fitted to her needs—and budget.

"All the time the salesman is sizing up the prospect. Let me warn you—don't judge her too much by her clothes! The highest priced model I have ever sold was to an Indian in overalls.

"As the interview progresses, the salesman becomes more conscious of the prospect's name and face—two important features for future reference. This prospect will work for the salesman in many ways if she buys from him. She will send her friends, and will, in fact, help the salesman more in competitive deals than any other agency.

"I have in mind a customer of the silent type, hard to meet. I came very close to exhausting my patience and interest in her, yet because I carefully controlled myself in handling this trying woman, she sent me six customers—neighbors and friends—within a year. And her neighbors and friends influenced eighteen of their neighbors and friends, so I had a lot to thank that woman for in the long run.

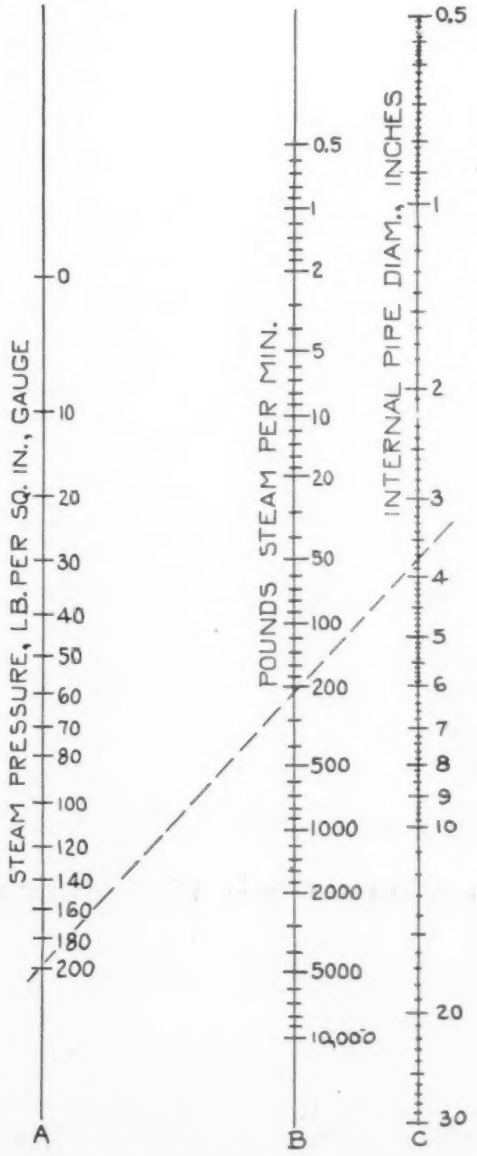
"Although the closing point is vital, I cannot tell you how to carry it out. Each salesman has a different method, but to me concluding the transaction means helping the prospect to decide. The sales must be absolutely satisfactory to both parties. The prospect must know she has made a wise purchase and feel pleased toward the salesman and the store. Most salesmen go past the closing point without knowing it. Then, too, they fail to sell the customer the RIGHT appliance. The customer is in an unsettled state of mind after the appliance is delivered to her home. She will return for some kind of readjustment, wasting your time and energy, and perhaps taking toll of your profit from the original transaction, if you overreach yourself in satisfying her. The only kind of a return visit you want—and that is accomplished on the first trip by selling her the RIGHT appliance—is when the customer can do you some *good*. She will, if treated rightly in the first place, become your store's best advertiser."

What Size Steam Pipe?—What Steam Pressure?—How Many Pounds of Steam Per Minute?

By

W. F. Schaphorst, M.E.

Newark, N. J.



This convenient chart gives quick answers to such questions as the above for average steam service.

Numerous pages have been devoted during recent years to steam charts and formulas, but unfortunately both the charts and formulas have usually been more or less bewildering to many readers. The accompanying chart is an effort by the writer to make one as simple and practical as possible. It required only one operation for the solution of the problem. It is based upon the velocity of steam that is used most, namely, 6000 feet per minute.

Thus for example, what size steam pipe shall be used where the steam pressure is 200 pounds gauge and where 225 pounds of steam are to be used per minute? The dotted line across the chart shows how easily it is done. Simply run a straight line through the 200, column A, and the 225, column B. The intersection with column C gives the answer as 3.75 inches internal pipe diameter. This is very close to a 4-inch pipe and therefore a 4-inch pipe should be used.

When the steam pressure is known (column A), and the pipe is already installed, the diameter of course is a known quantity (column C) and the pounds of steam that the pipe will carry per minute is easily determined by simply connecting the known factor in column A with the known factor in column C. The intersection with column B gives the pounds of steam per minute.

On the whole this chart will be found satisfactory for most short pipes where the pressure drop is small, amounting to only 2 or 3 pounds. Most steam pipes are short and it therefore is unnecessary to worry about the complexities to be found in so many of the steam flow formulas commonly seen in print.

A Glance at the Oil Transportation Situation

Subways for Defense—

Diversion of 50 American oil tankships to British war service has developed a need for more extensive petroleum transportation facilities in the heavily-consuming Eastern section of the United States, and also has given petroleum pipe lines publicity never before enjoyed.

Outside the petroleum industry, little has been known about the industry's own 200,000-mile system of pipe lines, or of the pipe-liners who operate it. Yet the pipe line system is almost as old as the industry, and its operation has become an industry within an industry. It is a vast subway system with its own lines of communications, its power plants, its dispatchers, construction crews, line walkers, and all the other attributes.

Industry Within Industry—

This industry within an industry started as a single line from Pennsylvania's oil fields to Atlantic Coast refineries about 75 years ago, when other transportation facilities proved inadequate to handle America's growing oil production.

In those days there were three systems of oil transportation. One was by railroad, utilizing the crude predecessor of the modern tank car, or loading barrels of oil in freight cars. Another was by barrels and tanks loaded upon barges, when there was enough water in the creeks and rivers, enough barrels and tanks to hold the oil, and the waterways were convenient to the oil fields. Third, and chiefly local method was by barrels carried in wagons. When there were sufficient barrels, wagons, teamsters, and horses, and the weather made the roads passable, wheeled caravans conveyed the oil to refineries or shipping terminals.

Development of the pipe line, a Western Pennsylvania project, spelled disaster for railroads, teamsters, and rivermen alike. They vented their indignation by destroying or damaging the early pipe lines almost as rapidly as they could be built. For a number of years the railroads successfully hampered the growth of pipe lines by refusing to permit the lines to cross railroad rights of way or to tunnel under tracks. Thereupon the pipe-liners laid their lines to and from the tracks, ferried the oil across in wagons.

Irresistible Flood—

There was no stopping the irresistible flood of American oil, however, and eventually the pipe line system began to work in peace, and also to grow. Today this system consists of some 54,000 miles of crude-oil gathering lines, which carry the oil locally from small storage tanks in the oil fields to trunk pipe lines; 62,000 miles of crude-oil trunk pipe line, which move the oil to tank farms or to refineries, and even to railroad and ship terminals, and about 10,000 miles of line carrying refined products, such as gasoline and lubricants. There is even another, and larger, pipe line system. It consists of around 190,000 miles of pipe line transporting natural gas from producing areas to consuming centers.

Economic Miracle—

From the standpoint of economics, the pipe line is something of a miracle. It is reasonably cheap and fast in the building, and the upkeep is not too high. Being buried, the pipe line is safe. It is both fast and commodious, a 14-inch line being capable of moving a cargo at the rate of five miles an hour, or 95,000 barrels 120 miles per day. The pipe line provides not only transportation, but storage capacity, no disadvantage to an industry handling liquid commodities.

Until now the majority of pipe lines has been on the order of 12 inches and smaller in diameter. This situation has placed the pipe line in somewhat unfavorable light of comparison with the tankship. A 12-inch line can move 60,000 barrels per day. A tankship can move up to 150,000 barrels a day. The tankship's speed is about twice that of the pipe line.

On the other hand, the tankship cannot operate every day. The average tanker can transport about 1,500,000 barrels a year, or an average of only 4,000 barrels per day, on the Atlantic Coast run. In this service a 12-inch pipe line would be the equivalent of 15 tankships, a 20-inch refined products line would provide the capacity of nearly 60 tankers.

In speed of construction, the advantage is with the pipe line. Its building can be measured in weeks rather than months. A portion of it can be used while the rest is being constructed.

Motive Power

Pumping stations, located 20 to 60 miles apart, depending upon the nature of the terrain, provide the motive power for the pipe line. The more stations, the greater the speed and capacity of the line. The more mountainous the area, the more stations needed.

Huge Capacity Expected—

Meeting defense needs of the Atlantic Coast area by proposed construction of large-capacity trunk pipe lines will be something in the nature of an experiment. Calculations differ as to what may be expected in the way of performance, but it is estimated that a 14-inch line would move 95,000 barrels of gasoline a day, a 20-inch line 235,000 barrels, and a 24-inch line approximately 300,000 barrels. Transportation of crude oil, a heavier liquid, would reduce the capacity of the lines, but only fractionally. However, there are those who contend that a couple of large pipe lines would free the Atlantic Coast from dependence upon tankships.

Preparedness on Wheels—

Lessons learned in bombed Britain that motor trucks are the only flexible and dependable medium of large-scale transportation in modern warfare, apparently have been studied in this country also. The notorious Texas law, limiting motor trucks to a 7,000-pound cargo unless their destination was a railroad station, has been amended to permit a gross weight of 38,000 pounds. The Tennessee truck law also has been amended so that the gross weight is increased to 30,000 pounds from 24,000.

Britain learned the hard way that bombs can do great damage to railroad tracks, trains, and terminals, but that there's always another road the trucks can use. Early in the war Britain tried moving all war goods by rail. Bombing of railroad termi-

(Concluded on page 46)

From a news release of American Petroleum Institute Department of Public Relations.

Gas Water Heating

This Company Provides for Continued Consumer Acceptance of Gas for Water Heating Through the Promotion of Rust-Proof Heaters—Sells More Than 3000 Units in 60-Day Campaign

By

Lucius S. Flint

BELIEVING that water conditions are likely to have a marked effect on the public's continued acceptance of gas water heating, the Southern California Gas Company and the Southern Counties Gas Company have, in the past year run a unique 60-day sales campaigns which sold more than 6000 rust-proof water heaters and have doubled the permanent sales of this type of merchandise.

In Southern California, as in most other parts of the nation, gas has always been the accepted water heating fuel. The two Southern California properties have a strong interest in seeing that this acceptance continues, that the public is never given reasons to consider any other method. Therefore, they've anticipated the only major source of complaint—the tendency of ordinary heaters in certain localities to rust out.

In some sections of the Southern California territory, heaters have as long a life as anywhere else in the nation. In other localities a galvanized tank will rust out in as little as two years. To date, research has never revealed the exact cause of this difficulty, has failed to provide a "cure" in the water itself. Hence, the only sound approach to the problem lay in selling the public the idea that gas isn't at fault and that in the rust-proof unit a successful method is provided for meeting the water difficulties.

Because the problem is a long-range one, the companies first considered an institutional type of advertising—the educational appeal. But on the basis of past experience, they decided against this approach. In many other cases it has been proved that actual merchandise in use is the very best salesman.

The second basic principle taken into account in planning the first rust-proof water heater campaign was the potency of the discount inducement. The Southern California companies have always found that the quickest and soundest way to pioneer a new type of merchandise is to create an immediate inducement for buying. And experience has proved that if the campaigns in which special discounts are offered are scattered widely enough there is no bad effect on between-time sales. In fact, permanent sales increases invariably follow the introductory drive.

Principle number three was that the retailer's normal mark-up must be preserved and in him a strong enthusiasm must be created. The Southern California companies have found that the best any advertising can be expected to do is to create an inquiry at the point of sale. If they meet an apathetic attitude here, the whole advertising expenditure is wasted.

The price reduction offered the consumer was absorbed by the gas company and the manufacturer. In the first campaign, held a year ago, the reduction amounted to 75 cents per gallon of capacity—the total discounts ranging from $15.00 to $30.00. This year consumer acceptance had been established to a point where the company was able to get the desired results with a slightly smaller reduction—a flat discount of $15.00 on any size. It's interesting to note here that in the 1941 campaign more than 3000 rustproof heaters were sold as compared with just 3000 in 1940. This despite a shortage of merchandise.

The $15.00 reduction on the price of any approved heater was offered in addition to the usual trade-in allowance. On each accepted installation, the dealer was given a $9.00 credit, a portion of this being paid by the gas company and the remainder by the manufacturer.

The gas companies promoted the campaign through widespread utility advertising including display space in more than 200 daily and weekly newspapers, a complete showing of outdoor posters throughout the territory, bill stuffers and truck card material. In addition, campaign displays were made on all gas company sales floors and windows and dealers were furnished with a variety of promotional material including banners, truck cards, and tags. Finally, gas company survey files were made available to dealers for use during the drive. The individual dealer had only to ask for heater prospect lists in the particular territory where he operated.

In addition to running this heavy campaign of its own advertising, the gas companies cooperated with dealers and manufacturers on tie-up material, allowing credits up to 12% of dealer purchases. The company required that all advertising which is subsidized had to be approved by the manufacturer and that all participation should be through the manufacturer rather than directly with the dealer. Only general circulation media were accepted in the campaign —that is newspaper, radio, billboards, etc.

In one of their own advertising campaigns, the gas companies dramatized the "under the skin" difference between apparently similar water heaters. One ad in this series used an illustration of a pair of pups which looked just exactly alike—along with two water heaters which were equally similar in appearance. The headline copy read, "Alike as two pups, you'd say if you saw these heaters. But only one of them has a tank that's FAILURE-PROOF." Another ad in the series carried out this same idea with illustrations of twin boys, again with a pair of water heaters which looked exactly alike. Headline copy was similar to that in the first ad. Illustrations of apparently duplicate racing cars, duplicate teddy bears and other common objects were employed in the campaign of comparison.

The previous year's campaign carried out a more conventional appeal, illustrating various members of the family enjoying greater satisfaction from completely dependable water heating. Incidentally, the current

They may look the same at the start . . . but
ONLY ONE OF THESE HEATERS HAS A TANK THAT'S
Failure-proof
Only one of them is RUST-PROOF!
Buy now and SAVE $15
HERE'S YOUR OPPORTUNITY to get a water heater that will last you years longer than an ordinary heater. And you'll save as much as $15—plus trade-in and liberal terms! How? By purchasing a Rust-Proof water heater during this special sale. For these marvelous R-P heaters do away with the chief causes of heater failure—rust and corrosion. And for a limited time only, they are offered for sale at a special discount.
DON'T JUDGE BY LOOKS—JUDGE BY LABEL! No matter what heating method you use, any water heater will corrode and leak unless made of rustproof metal. So look for the R-P seal on any water heater you buy. It's your unconditional guarantee against rust for 10 years or more. See a merchant plumber, dealer or your gas company.
SOUTHERN CALIFORNIA GAS COMPANY
YOU SAVE $15
IF YOU ACT NOW! And you get liberal trade-in for your present water heater. Terms
Hot water when you want it, at the temperature you like, is yours with a Crown Rust-Proof automatic gas water heater. Has entirely automatic soap-action thermostat; "Quikset" temperature indicator. Ask about size to fit the needs of your home. Reg. price, 20-gal. size, $93.50. Sale price, after trade-in, $69
You'll be glad to own this Rust-Proof Continental automatic gas water heater. Equipped with Grayson Unitrol to keep water at whatever temperature you set. Pure-Dure tank. Heavy insulation assures fuel economy. Regular price, 20-gallon size, $93.50. Sale price, after trade-in, $69. Easy terms.
Gas WATER HEATERS

year's flat campaign discount permitted its mention in the advertising—something which wasn't possible under the previous year's graduated discount scale.

In a series of 10 dinner meetings for dealers and their families—meetings held throughout the territory—the companies played up the same "under the skin" comparisons which were used in the consumer advertising. With selling demonstrations, slides, movies and sales talks, the companies emphasized the fact that whereas it takes a super-salesman to bring out the fine points of difference between two similar water heaters of the ordinary type, anyone can readily show additional value in a rust-proof heater, as compared to the ordinary type.

As an additional means of aiding in the dramatization of the rust-proof idea, the gas companies developed a special seal which was placed on each appliance of this type and was used as a sort of trademark illustration in all advertising. The seal, incidentally, is a handsome red and gold sticker using the slogan copy: "Rust-proof—Longer Lasting."

Due to the longer-life expectancy of rust-proof heaters, the company was up against a rather difficult problem in showing dealers how to size properly. This difficulty was met by the inclusion of a sizing chart in the campaign outline which was furnished to all dealers in booklet form. The following excerpt from this presentation is of particular interest:

"Purchase of a rust-proof heater is a long-range investment; the buyer thinks it is the last he'll ever buy. Because so many families have never had a really adequate hot water supply, we cannot depend on the size of the heater they have had to indicate the size they should *now* buy. The possibility of additions to the family, additions to the house and the amount of water they really need under present conditions should be studied carefully before making a sizing recommendation. You do yourself and your customer injury when you make him buy a rustproof heater that is too small. Don't let him do it!

"No water heater sizing table will ever take the place of experience and intelligent study of a customer's needs. The table given below is the *minimum* in recommended storage tank sizes for ordinary domestic conditions. A tolerance of two gallons is included in the sizes recommended; for example, a 30-gallon means from 28 to 32 gallons."

WATER HEATER TANK SIZES

Total Number of Rooms, Excluding Bathrooms	*Number of Bathrooms* 1	2	3
2	20	—	—
3	20	—	—
4	20	—	—
5	20	30	—
6	20*	30	—
7	30	30*	40
8	30	40	40*
9	30	40	40*

Note 1. At the points marked * in the table it is usually better to install the next larger size.

Note 2. House with 10 or more rooms or 4 or more baths may be better served by installing 2 units.

The chart included in this section of the booklet was set up on a number-of-rooms basis. Down the left hand side of the chart were listed total number of rooms, excluding bathrooms. Across the top of the form were listed number of bathrooms. By checking these two points, the dealer could find in corresponding column entries the minimum gallon capacity which should be selected.

What was accomplished in the water heater campaign can easily be

They had to See it
The idea of street lighting with Gas had been laughed at while the pipes were being laid. But on the night of April 23, 1816, in Baltimore, Md., jeers turned to cheers. Here was a brighter, more efficient illumination than men had even dreamed of!
LEMO
1816

1931, Harper-Wyman Co.

Nothing convinces like demonstration

DEMONSTRATIONS of the Harper Burner System perform a job of vital importance to the gas industry. They prove the continuing superiority of gas as a fuel.

Actual demonstration shows modern cooking at peak efficiency . . . gives life and meaning to the Harper principle of 2 burners in 1"! It permits your customers to check for themselves the time-saving speed of the STARTING BURNER . . . the exactly measured boiling heat of the tiny, economical COOKING BURNER . . . and how the two burners, together or independently, quickly supply *every* required heat.

Let your customers see the Harper Burner System in action and most of your selling has been effectively accomplished! They see at once that nothing does the job so well as Gas!

DEMONSTRATES THAT "GAS DOES IT BEST"

HARPER
BURNER SYSTEM

TURN THIS PAGE FOR PROOF THAT DEMONSTRATION PAYS...

SHOW your customers how to save vitamins, minerals in foods

Every housewife wants to serve **more** healthful foods. She *can* . . . with a Harper-equipped range. Why not show her *how?* . . . and make her *want* a modern new gas range?

Show your customers with a Pyrex vessel and a thermometer that the "gentle" flame of the Harper COOKING BURNER keeps the contents of a covered vessel at *exact boiling heat.*

Explain that when water *is* kept at exact boiling heat it takes more than an hour to boil away a *cupful* . . . that therefore a cupful or *less* is all the water required by this burner for most cooking!

Now point out that the gentle boiling of the Harper COOKING BURNER, together with the small quantity of water it requires, preserves many important vitamins and minerals which otherwise are lost. In ordinary cooking these elements are lost in two ways—*"flooded out"* in excess water* and *"jostled out"* by agitated boiling which so often breaks down vegetable fibre.

Helpful new **FREE BOOKLET:** "How to Sell More Gas Ranges", contains a series of quick, convincing demonstrations proving the superiority of the modern gas range. Send for copies. *Harper-Wyman Company, 8562 Vincennes Avenue, Chicago.*

* * *

*Vitamins B, C and G are soluble in water. So are twelve minerals, some proteins, some starches and sugar. Water strained off and poured down the drain wastes valuable nutritive elements.

MINNEAPOLIS GAS LIGHT COMPANY
MINNEAPOLIS, MINNESOTA

May 1, 1941

Mr. H. J. Henke, Sales Department
Harper-Wyman Company
8562 Vincennes Avenue
Chicago, Illinois

Dear Sir:

Standing on my desk as I dictate this letter is the trophy awarded the Minneapolis Gas Light Company for leadership in the sale of C./P. Gas Ranges for 1940 in our Region.

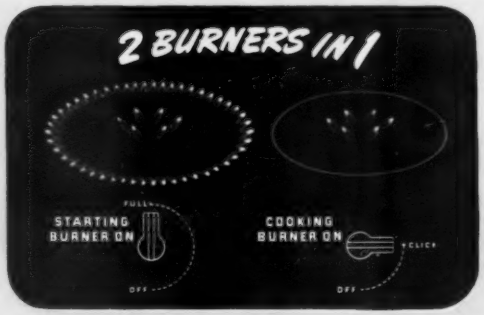
The Harper Burner System was an outstanding C./P. feature on every one of these fine A-B Gas Ranges. This superlative burner arrangement and the national advertising in back of it deserve a generous share of the credit for the great success of the nation wide C./P. program.

To demonstrate a Harper equipped range without gas connections would truly be, "Hiding your light under a bushel." Our salesmen insist that such ranges be connected, for then they say, "I can really show the customer how the Harper Burner System saves time, food and fuel."

Very truly yours,

E. J. Boyer
Sales Manager

EJB/rob



HARPER BURNER SYSTEM

The Harper Burner System operates on the unique principle of "2 burners in 1" . . . a* STARTING BURNER *plus a small, economical* COOKING BURNER, *both controlled by the same handle. It is subject to finer gradations of low heats—greater control and economy—than any other cooking unit made.

—one of the standards of top burner performance under CP

accomplished with any appliance if the same basic principles used here are applied, in the opinion of E. J. Strickland, Sales Promotion Engineer for the Southern California Gas Company. In review, those principles are—immediate buying inducement for the customer, extensive merchandise promotion and preservation of normal mark-up for the retailer.

Mr. Strickland cites as another good example of the potency of these principles, the company's record in promotion of clock controlled ranges. The records show that today the Southern California companies have on their lines more than 80 per cent of all the clock controlled ranges in the United States. Back in 1934, they launched their promotion of the clock controlled range, spending some $300,000 in a 60-day campaign which was carried out in practically the same way as the water heater drive. More than 13,000 ranges were sold in that drive and during the following year better than 40 per cent of all ranges sold were of this type. Repeating those campaigns in 1936 and 1938 the company again sold more than 13,000 ranges on each occasion. And each time the percentage of total permanent sales on appliances of this type showed a definite gain.

New Formulas for Liquids In Horizontal Cylindrical Tanks

By

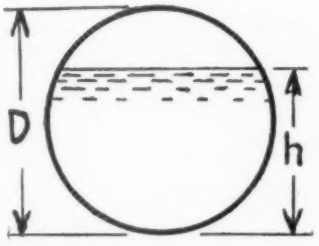
W. F. Schaphorst, M.E.

Newark, N. J.

Several charts have been developed for the determination of contents of cylindrical tanks lying in a horizontal position, and of course there are tables, but this writer has been asked for a simple formula suitable for more accurately computing contents without the use of charts.

Charts at their best, cannot be as accurate as formulas, but charts are excellent nevertheless for approximate determinations and for checking the results obtained from formulas.

Here is a new formula based on a very excellent formula for areas of segments of circles given by Prof.



John Goodman in his "Mechanics Applied to Engineering." The chief objection to Prof. Goodman's original formula is that it involves two different chords and it does not include the diameter at all. This new formula is therefore based on a modification of Goodman's formula, reducing it to two factors—the diameter of the circle and the height of the segment. As a result this formula for horizontal cylindrical tanks is offered:

$$G = .0023hL\ (1.5\ \sqrt{Dh - h^2} + \sqrt{Dh})$$

Where

G = Number of gallons of liquid in the tank;

h = Height of the liquid in inches;

L = Inside length of the tank, in inches;

D = Inside diameter of the tank, inches.

But this formula is not applicable when the tank is more than half full. In other words, as soon as the height of the liquid becomes greater than one-half of the diameter of the tank one must deduct the empty space from a full tank. The remainder, of course, is the liquid in the tank. The formula for such situations—where the tank is more than half full—is as follows:

$$G = L\ [.0034D^2 - .0023\ (D\text{-}h)\ \{1.5\ \sqrt{h\ (D\text{-}h)} + \sqrt{D(D\text{-}h)}\}]$$

This writer has been searching for a truly simple formula on this subject for more than 30 years. If any reader has a simpler one than the above it will be appreciated by the writer and doubtless by many others.

Refractories for Gas Plants. Bulletin G of Keystone Refractories Co., 120 Liberty St., New York, describes their retort cement for horizontal, inclined or vertical retorts, Dura-stix for coke ovens and water gas sets, boiler baffles, arches, walls and repairs. Copy sent on request.

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Ramsey on National Defense

With the problem of National Defense the first order of business today, we cannot pass this opportunity to refer briefly to the responsibilities that you men, as executives and engineers of gas companies serving the highly industrialized area of the middlewest, have in bringing this program to a successful conclusion. The armaments required by our armed forces today, are far more complex as a result of the highly mechanized weapons that have been developed and of necessity must be used in combat, and will require the fullest cooperation from industry to make the tremendous quantities of these equipments available at the very earliest possible time.

While it would be impossible to point out specifically at this time, all of the ways in which your companies can cooperate with industries in your territories engaged in armament production, a brief review of the form this cooperation has taken in the case of the Rock Island Arsenal and the utility serving this arsenal, (Peoples Power Company) might be of interest. The engineering department and the purchasing department at the Rock Island Arsenal have in the past and are at the present time, making full use of the experience of the industrial staff of the local utility company in the selection of proper furnace equipment to meet the exacting needs of the Arsenal. The selection of these furnaces involves, as you know, many factors such as: whether the furnace be a batch type furnace, continuous furnace car bottom furnace; and then depending upon the metals to be treated, the type of burner equipment to be applied; the kind of furnace atmosphere to produce the desired results; the use of refractories that will result in low maintenance and operating costs; or in short, equipment that must turn out the required production with the lowest over-all operating cost. This same line of reasoning applies in the case of forging furnaces, metal melting furnaces, foundry applications, and the innumerable instances in a plant such as this, where gas fuel is used for heating operations. The assistance that has been rendered by the industrial staff of our utility has been of great assistance to our operating departments in making available to them the latest developments in industrial heating equipment. We believe that some similar plan should be worked out in the case of other industries, which now for the first time, are getting into armament production, and are meeting problems relating to heating applications that are not familiar. Suggestions and recommendations of the industrial staff of the utility, supplying them with service, will be most helpful, and in many instances may eliminate delay at this critical time getting into production.

Referring again to our own situation here at the Arsenal, we find that the service department of the local utility keeps well informed on the various types of heating equipment that are being installed at the Arsenal and are prepared to assist our own maintenance department in keeping this equipment in operation.

In the matter of adequate supply and feeder lines we look to the engineering and distribution department of our utility company for assurance of continued and adequate supply of gas fuel to meet all reasonable operating requirements. We feel it to be the duty and responsibility of the personnel of the utility supplying our requirements to call to our attention any situation that might develop that would result in jeopardizing our production schedules. We believe you men should carry these same responsibilities to the customers in your own territories, and that you should give thorough study to all phases of the services you render your industrial customer, to the end that he can devote his energies and facilities to production and that he will not be confronted with additional problems relating to heating operations, which you can well take care of for him.

Since gas has assumed the major role as a fuel for industrial heating operations, additional responsibilities fall on the shoulders of the management of utilities supplying these services, to protect these facilities from damage or impairment of their usefulness. This is especially true in the case of utilities serving vital Defense Industries. Study and thought should be given to means of safeguarding plants and equipment, essential in the distribution of gas, and plans worked out for meeting emergencies should they occur.

Portion of talk by Brig. General Norman F. Ramsey, Commandant Rock Island Arsenal, at Midwest Industrial Gas Sales Council, May 8, 1941.

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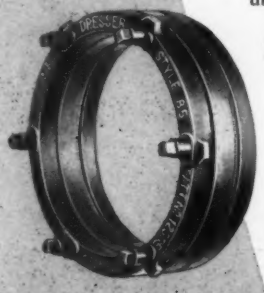

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Made specifically for maximum H_2S removal, its practical capacity and activity are controlled factors; it offers maximum activity for trace removal and it has maximum shock resistance.

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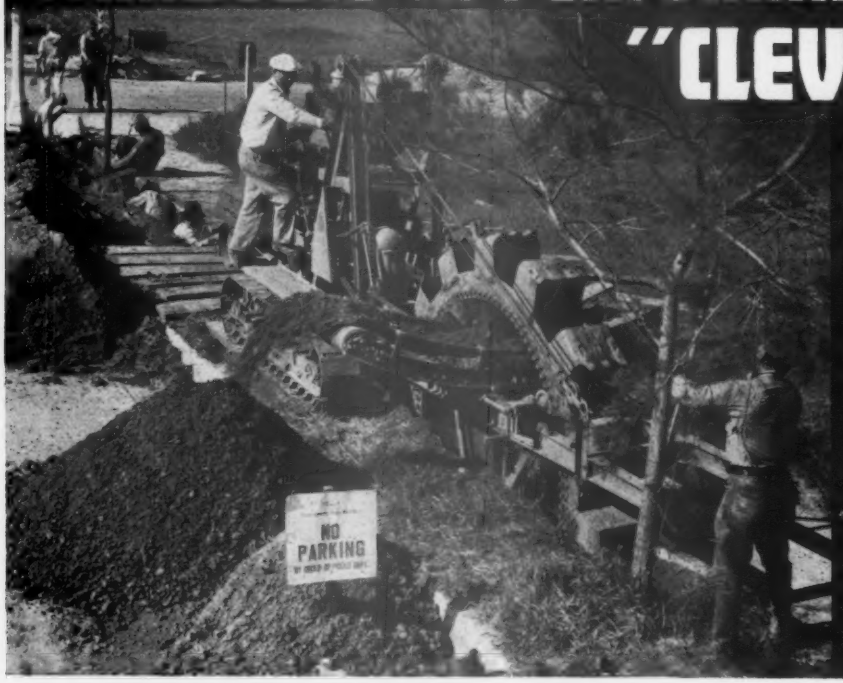

● Cleveland, for years, has led the field in the production of trenching machines for city and town gas distribution work. The answer is in standout performance.

Clevelands are supreme in their ability to get *in* where the pipe has to be laid and to get the job *done* with maximum speed and lowest cost.

Pictorially portrayed, at left, is a striking example of their compact construction and maneuverability. Machine shown is a "Baby Digger" (Model 95). Despite sidewalks, light-poles and small trees, it is delivering machine-work savings on 98% of this job.

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Another feature that makes "Clevelands" "standouts" in the field is Truck Speed Transportation on specially built trailers. They load and unload in from 10 to 15 minutes.

The Recovery of Natural Gas from Coal

By
Leo Ranney
Technical Consultant, Ranney Water Collector Corp., Columbus, Ohio

WHEN natural production from an eastern oil field becomes no longer profitable, there is still left in the ground from 80 to 85 per cent of the original oil content. That is worth recovering by "secondary" methods. When gas wells cease to produce naturally, the field is well gone and only a very small percentage of the original gas is left in the pores of the sand, it is hardly worth trying to capture.

So natural gas is really a wasting asset. Since it is the most nearly perfect of all natural fuels, it is the most heavily drawn upon—and is the one fuel that will be missed more than any other when it is gone. In the East that day is not far off. Each year hundreds of eastern gas wells are being pulled and abandoned. A large percentage of the natural gas used in Ohio is imported from other states—and in Pennsylvania and New York natural gas lines are being filled with lower-grade manufactured gas. To transport natural gas from Texas costs about 2 cents per thousand cubic feet per hundred miles of transit.

We have been and are a wasteful people. In the old days the eastern oil fields were drilled only for oil. When gas was found it brought only curses from the driller. So gas wells were allowed to "flow open" for weeks and months on end, in the hope that they would "blow into oil"—which they often did. After a billion dollars' worth of this valuable fuel had been wasted, some dreamer got the idea that the gas might be saved. Now in the East, hardly a cubic foot of gas is allowed to waste from an oil well.

But today approximately 500 million cubic feet of natural gas is being wasted every twenty-four hours from our coal mines, mostly in the East where it is badly needed. And whoever suggests its recovery and use is likely to be considered visionary or crazy. This natural gas is methane—the deadly firedamp of the coal mines—with a heat value of 1000 British thermal units per cubic foot.

Some of the coal seams of Ohio, West Virginia and Pennsylvania contain from 800 to 2000 cubic feet of methane per ton of coal in place.

(Reprinted from Engineering Experiment Station News, Ohio State University, June, 1941.)

This gas is slowly exuded into the mine workings from the coal face. Some of our mines produce as much as 6,000,000 cu. ft. of methane per day, and the cost of ventilating such mines may exceed 10 cents per ton of coal mined. In one case 27 tons of air must be blown through the workings for each ton of coal produced.

During 1940 in the United States some 275 miners lost their lives in mine explosions. Because of just one mine explosion (from gas) in Ohio a few years ago, the Industrial Commission has paid to date well over a million dollars to the families of the men destroyed—and is still paying. This case is only one of dozens. Each year mine owners meet and spend days discussing better fans, better brattices, better methods of diluting the gas. But never a word about recovering the gas from coal in advance of mining operations. What would we think of the medical profession if their whole attention were absorbed in methods of treating disease—with not a thought given to removing the cause or killing the germ?

Night picture of a degasification experiment near McConnelsville, Ohio. Burning Methane from coal in place. Production shown is at the rate of 2,000,000 cu. ft. daily.

Great Gas Fields

A careful study must lead to the conclusion that the greatest gas fields of the East exist in our coal deposits. In West Virginia a coal seam in one field contains upwards of two trillion cubic feet of sorbed methane—2000 cu. ft. per ton of coal in place, and 22 million cubic feet per acre. This free gas adds nothing to the value of the coal, because it never reaches the market.

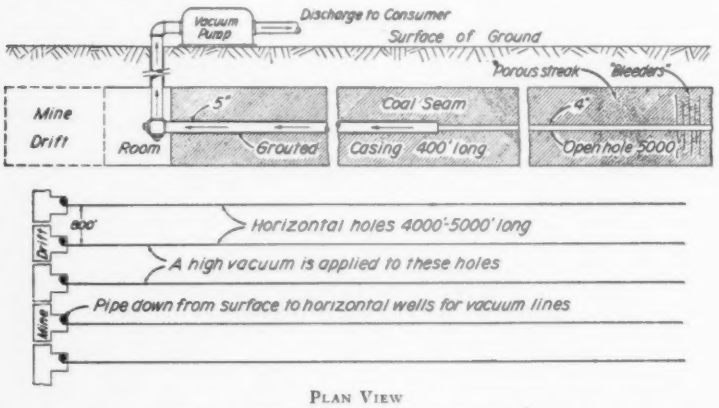
How can a ton of coal contain 2000 cu. ft. of gas? Certainly not in the crevices and pores. It is held in the coal itself by intermolecular sorption. But methane (the wildest hydrocarbon gas) and solid carbon are so far apart in the scale that the equilibrium in which the methane is held is most unstable. The two are hard to "mix." It has been found that the most practical method of upsetting this equilibrium and releasing the gas is by a reduction of pressure—the application of a partial vacuum to the coal. Some mines have been known to increase their exudation of firedamp by a million cubic feet a day because of such an insignificant thing as a low barometer.

The main problem then is to distribute a vacuum into the body of coal to pull the gas out, through porous streaks, seams, "bleeders" and fissures. Research has indicated that the average bituminious coal seam is as permeable as the average gas sand, and that a high vacuum will pull methane through 400 feet of average coal.

The problem of distributing the vacuum has at last been solved by our ability to drill long horizontal holes —4000 to 5000 feet long in coal—and to control the elevation of the hole at any depth, to follow the contour of the coal seam. Such holes may be drilled from mine workings out into virgin coal, the holes being a mile long and being spaced about 800 feet apart. Each hole is cased at the mine and with 400 feet of pipe,

METHOD OF DEGASIFYING COAL IN PLACE

Horizontal gas wells are drilled into virgin coal from mine workings. A high vacuum is pulled on the casing of each well to release the firedamp (natural gas). No free gas enters the workings.



PLAN VIEW

SPACING OF HORIZONTAL GAS WELLS IN COAL SEAMS

These wells follow a predetermined course, or may be made to follow undulations in the bed. The method of drilling is the same as that used in drilling horizontal oil wells.

grouted in. A high vacuum is then applied to the accessible end of the casing—which transforms each horizontal hole into a large gas well.

Neither during drilling or operating is any free gas allowed to enter the mine air. Drilling is done through stuffing boxes, and vertical holes from the surface down to the horizontal well casings contain pipes to conduct the gas vertically to the surface of the ground. The vacuum pump is on the surface.

If we assume that a partial vacuum will pull gas through 400 feet of coal, on each side of a horizontal well there, a block of coal 800 feet wide is affected by each well—approximately 2 acres for each 100 feet of well length. Then a well 4000 feet long would drain gas from 80 acres. In some coal seams the influence of a vacuum would extend farther, in others not so far. But if this may be considered average, then in our most gaseous coal seams a maximum of 1,500,000,000 cu. ft. of gas would be drawn upon by each horizontal well.

Promise of Profit

No matter how desirable a humanitarian development may be, if it is an innovation that is to be widely adopted at once, it should also promise a profit to the coal operators. The overall cost of producing gas from these horizontal wells in a gassy seam is estimated at 5 cents or less a thousand cubic feet. The selling price would vary from 15 cents to 25 cents a thousand, depending upon who the customer is. A recovery of 50 million cubic feet should more than liquidate the cost of each well, and the operating cost from then on should be about 2½ cents a thousand cubic feet.

The percentage of recovery of this free methane by the application of a vacuum must vary with the free gas content, and the permeability and solidity of the coal. In recently exposed coal faces in going mines between 90 and 95 per cent of the sorbed methane has vanished into the air of ventilation—without the application of a vacuum.

In ordinary mining and marketing operations the gas is gone long before the coal reaches the furnaces. So the removal of methane from coal in place has no effect on market values. In the average coal it may be assumed that a vacuum will recover from 75 to 90 per cent of the sorbed gas. Then de-gasification becomes directly profitable.

The indirect profit to the operator lies in the elimination of occasional ventilating shafts, reduced ventilation costs in future mining operations, reduced compensation insurance rates, reduced taxes, a smaller number of damage suits (after a major disaster these often total over a million dollars)—all because by degasification the coal may be made at least partially non-gaseous.

Of far greater importance, to the householder, to industry and to the State, is the fact that the recovery of coal gas in advance of mining operations will release a new national asset of great value that was not known to exist—and will save the lives of thousands of miners during the years to come.

Carbide and Carbon Corp. Announces Executive Changes

Directors of the Union Carbide and Carbon Corporation at a meeting held May 27th elected Jesse J. Ricks, formerly president of the Corporation, as chairman of the board. Benjamin O'Shea, formerly vice-president, was named as the new president.

At the same meeting James A. Rafferty, a vice-president, was elected to the board of directors to fill the vacancy caused by the resignation of Matthew J. Carney. Robert W. White, secretary and treasurer, was made a vice-president as well. Both the new chairman and the new president have been associated with the Corporation since its formation in 1917.

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Connelly engineers, backed by more than 64 years of experience in gas purification, are at your service. We will gladly make an analysis of your problems and submit unbiased recommendations without obligation.

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Gas Heating System in Armory at Los Angeles

By
Fred A. Herr
Los Angeles, Calif.

GAS IS USED as the fuel for two of the three types of heating employed in the new Naval and Marine Reserve Armory at Los Angeles. The building is heated by two systems — direct and indirect. Gas is used for the indirect system in the form of gas-fired boilers in a central heating plant which serves a hot water heating and ventilating system for one portion of the building; and also forms the fuel for a direct heating system in the form of gas-fired unit heaters installed in a series of enlisted men's class rooms and instruction hall, and for space heaters in the quarters of the commandant and his adjutants. The third type of heating consists of electric space heaters in the sick bay, volume heaters for the drill deck, and electric unit heaters to augment gas unit heaters in the admiral's quarters.

Site of the armory is a trough-shaped valley known as Chavez Ravine, in the Elysian Hills several miles northwest of the Los Angeles business district. The structure, a W.P.A. project, represents an outlay of $940,053, which was sponsored financially by the Board of Supervisors of Los Angeles County as an emergency work relief project.

The armory is of reinforced concrete in two distinct sections. The forepart consists of an administration building of two stories and basement, which houses administrative offices, recruiting department, officers living quarters, a swimming pool, mess halls for feeding 400 enlisted men, quarters for several units of the reserve corps, kitchens, band room, shower and dressing rooms, a target range, and store rooms.

The rear section, called the drill deck, adjoins the administration section, but each unit has individual walls and is structurally separate from the other. This design, it is claimed, provides additional resistance to earthquake forces.

The drill deck, 127 by 265 feet, is structurally unique in that it is topped by the world's largest Lamella roof. The armory, as a whole, provides accommodations for 2,500 reserve officers and enlisted men.

Exterior view of new Naval and Marine Reserve Armory at Los Angeles, in which gas is used for a direct and an indirect heating system which serves different parts of the building.

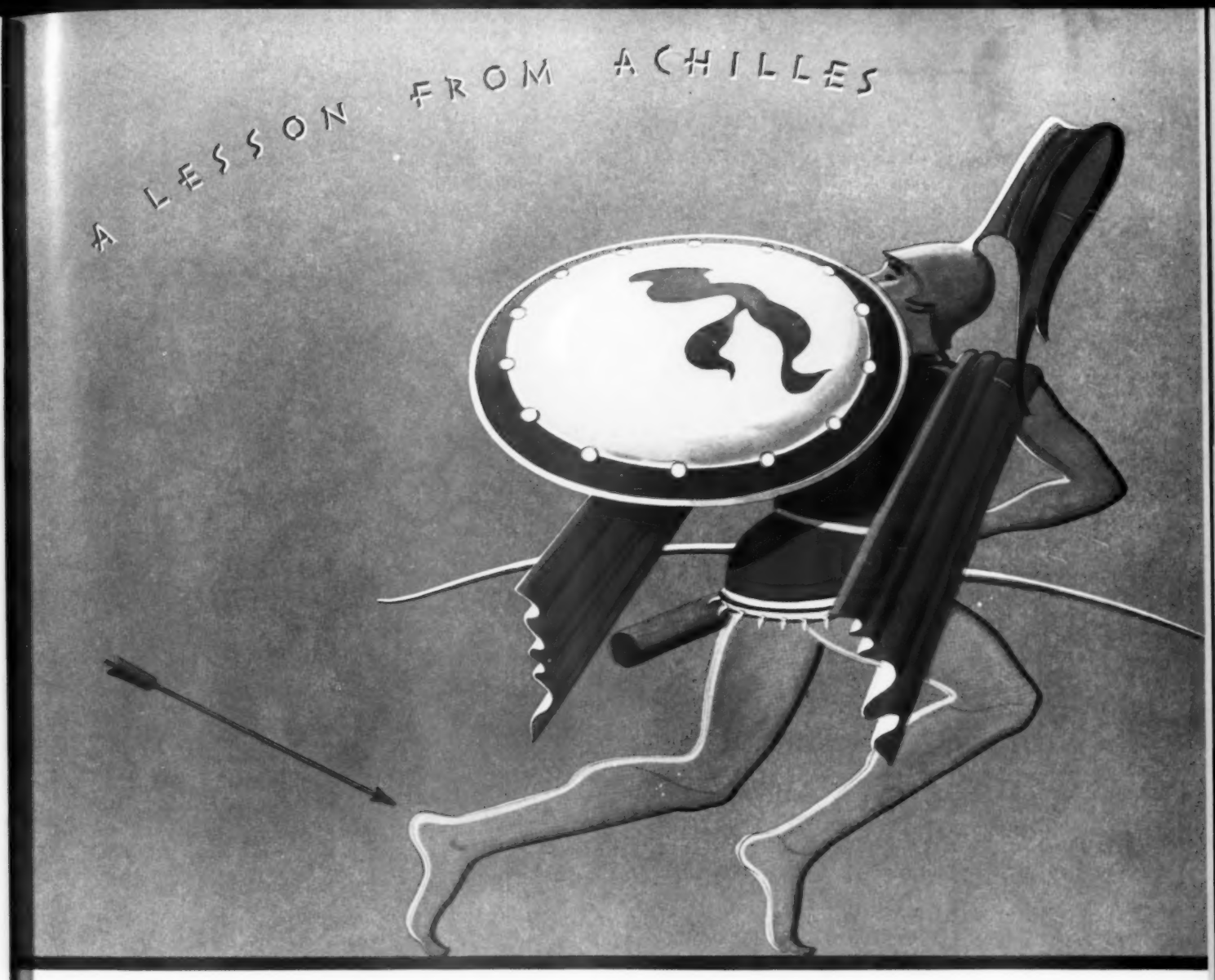
The gas-fired boiler plant serves a hot water blast heating and ventilating system designed for heating the basement and larger rooms on the first and top floors of the administration building. Fans installed in ducts in the upper part at one end of the various rooms discharge heated air into the rooms, with exhaust fans installed near floor level at the other end withdrawing the air.

The boiler which is already in place in the basement boiler plant is a Kewanee. Its steam radiation is 15,180 square feet, water radiation 24,280, B.T.U. rating 3,643,000 per hour. The boiler has a furnace burning volume of 126 cubic feet of gas per hour. The pump serving the boiler is a Nash-Jennings (405 G.P.M.), which pumps 210 degree water from the boiler and circulates it through the building at 600 feet per minute.

Unique is the gas boiler's water return hookup. A departure from conventional installations is made by discharging supply water at the bottom of the boiler and bringing return water in at the top through a header which, though corresponding to a steam supply header in the orthodox system, represents a hot water return header in the armory installation.

This unusual type of hookup was used to save the expense of an operating engineer, for under a State law in California an operating engineer must be employed in any building in which boiler pressure exceeds 15 pounds and the rating 10 h.p. Had the usual method of forcing the water through the boiler with the pump been employed, static and pump pressure would have exceeded the minimum permitted for a low pressure installation. The cost of extra fittings, pipe and connections precluded locating the pump on the discharge side and circulating the other way round.

Structural features of the building dictated the use of circulating hot water supplied by a central gas-fired boiler plant. In no other practical way, it was found, could the larger rooms in the basement of the forepart of the army be supplied with heat without the use of a costly trench for piping. The low ceilings obviated use of ducts, and since



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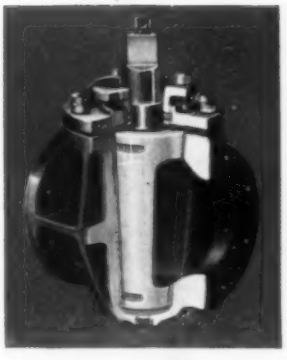
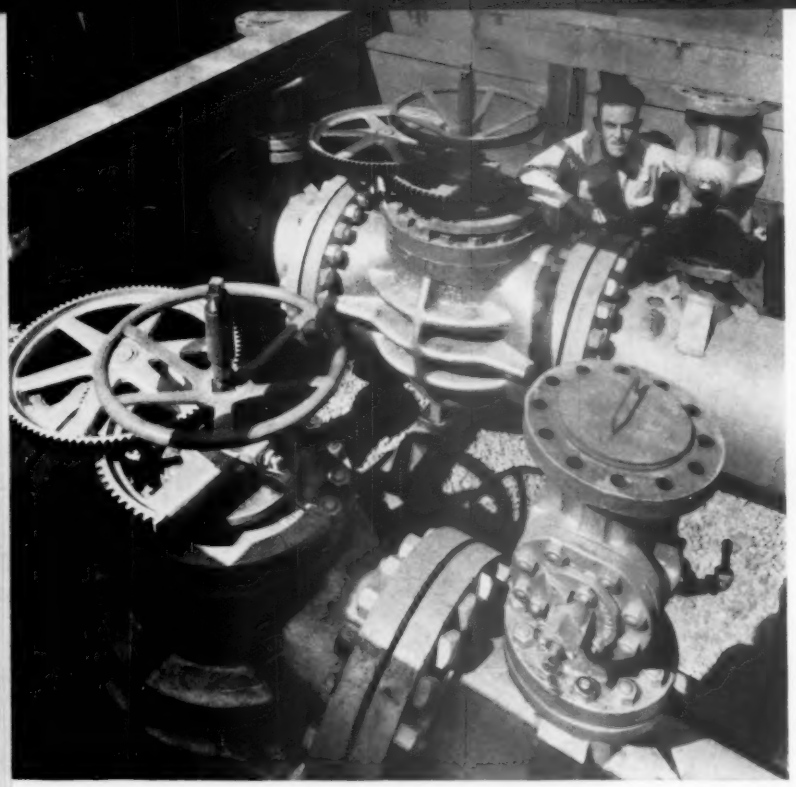
FORM A FIFTH COLUMN

One "temperamental" valve on an important line in your plant or in the field might tie up your major flow of production. Check back in your experience and you can recall such instances. A single valve failure usually costs many times the price of the valve. ¶ Uninterruptedly, Nordstrom Valves are the "safety nerves" in well-engineered installations. They are literally the heart of the flow lines; easiest to switch flow; quickest to turn on or off; free from sticking; inherently protected against leaks by "Sealdport" lubrication. The plug is constantly seated. No sediment or deposits can creep in to prevent a tight closure. Nordstroms eliminate the weak, vulnerable points of line control.

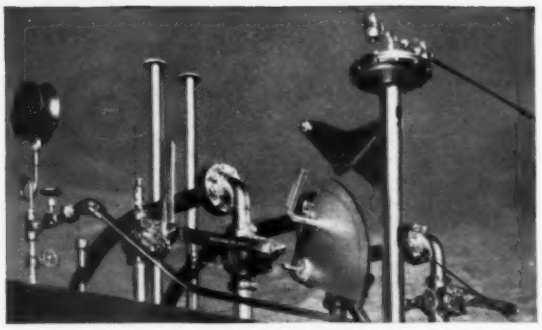


KEEP UPKEEP DOWN

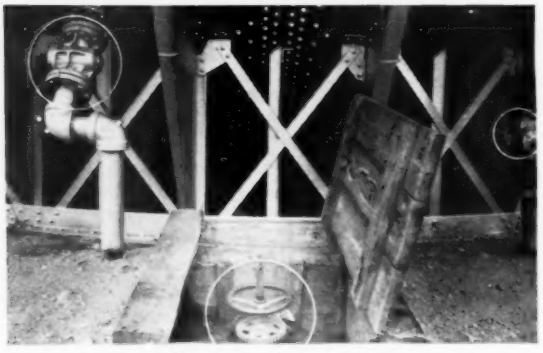
NORDSTROM VALVES



Nordstrom 500-lb. Semi-Steel Valves on 22" and 26" gas transmission mains. 6" valves used as blowoffs.



Nordstrom Valves on butane vapor discharge lines from storage tank.



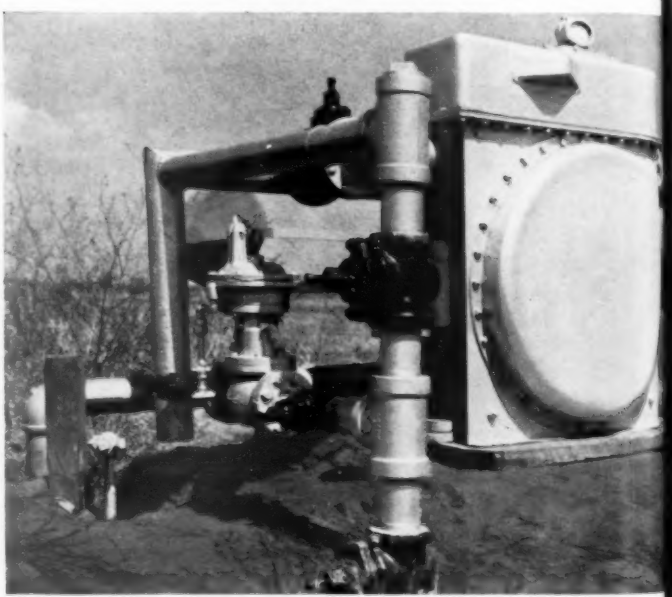
Nordstrom Valves on inlet and discharge lines of a spheriod gas tank.

Be prepared for *any* emergency with NORDSTROM VALVES

A quick shut-off of gas lines may save thousands of dollars. Nordstroms on *all* of your gas lines are the guarding sentinels. With a quarter turn the line is 100% shut off. The plug is completely sealed with pressure lubricant. Not a particle of gas can creep through. If a Nordstrom isn't operated for years it's still easy to turn on or off. On your remote lines this is of particular importance. Nordstroms handle all pressures, for city distribution, tank manifolds, main transmission lines and for curb and meter service. Sizes to 30". Screwed and flanged and bell ends; also for welded and special couplings.

Ask for Bulletin.

Recommend Nordstrom Valves to your industrial customers for installation on their boiler, furnace and other plant lines. It means more safety, better control, easier operation.



Nordstrom Valves and EMCO Gas Meter on line from gas wells.

Nordstrom LUBRICATED VALVES

Sealdport Lubrication

MERCO NORDSTROM VALVE COMPANY – *A Subsidiary of Pittsburgh Equitable Meter Company*

WORLD'S LARGEST MANUFACTURERS OF LUBRICATED PLUG VALVES; GASOLINE, OIL & GREASE METERS

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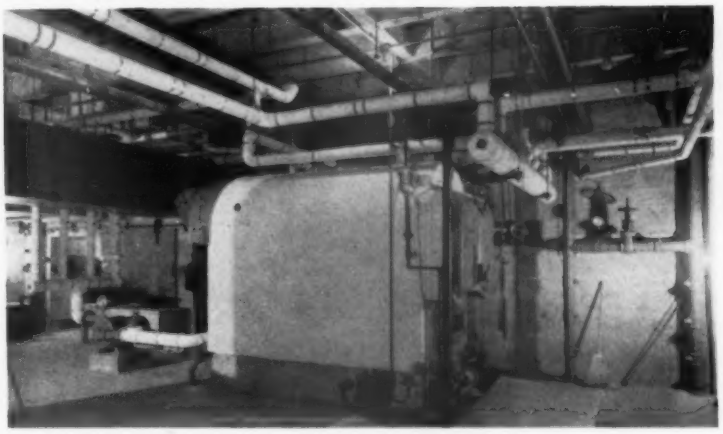


One of two gas-fired boilers in the boiler plant in the basement of the administration unit of the armory. Shown here is a Kewanee with a furnace burning volume of 126 cubic feet of gas per hour. Of note is the unusual hookup, with return water entering the header (front of boiler at top) and supply water discharging at bottom. A second boiler of similar type and size is currently being installed by the Navy Department.

steam would have made necessary a trench for return pipes, the designers settled on a hot water system in which supply and return lines could be accommodated along the ceiling.

Rooms in the basement, second and top floors of the administration section which are served by the gas-fired hot water blast system include a pistol range, kitchen, mess room for enlisted men which accommodates 400 at a sitting, swimming pool room, enlisted men's club, officers' ward room, canteen and several store rooms.

The heating system for these areas is designed for maintaining 70 degrees inside when the exterior temperature is 30 degrees F., which is accomplished by pre-heating the air to house temperature and reheating at point of use to desired local temperature by means of air heaters. Reheating is done with coil heaters installed in ducts. There is one bank of coils installed in a fan room on the top floor, another in the basement fan room. Water heated to 210 degrees in the central gas-fired boiler plant is delivered to the heaters under thermostatic control.

Eleven exhaust and four supply fans will ultimately serve the air distribution system. Two supply and five exhaust fans have already been installed by W.P.A., and the balance will be put in under the expansion plan now being carried out under the Navy Department's direction.

The main rooms in the basement, second and top floor are equipped with a blast distribution and exhaust system. This system introduces the warm air into rooms by fans installed in a duct opening into the room just under the ceiling at one end and withdraws by means of an exhaust fan in a duct at floor level at the opposite end of the room. The course of air, therefore, is completely across the room and downward.

A direct gas-fired system of heating is employed in 12 rooms on the second floor of the administration building which are used as class rooms for enlisted men. The space heaters, resting on the floor, are Meclanovents, each four feet long, one foot wide and 2½ feet high. The class rooms are all outside rooms, amply ventilated by windows, for which reason no exhaust system has been installed in this area.

The building's air intake terminates in the basement, adjoining the boiler room. The air intake is equipped with Staynew, moveable oil filters. No duct insulation is used in the army because all ducts are located in the heated areas, with no heat loss being suffered.

The original units of the heating system were installed by the W.P.A. engineering staff, with members of the Los Angeles County Heating and Ventilating Department collaborating. Designers of the heating system were Franklin E. Winch, a Los Angeles consulting engineer, and Arthur Hess, of English & Lauer, Inc., Los Angeles. The Navy department has now taken over the work and is enlarging the original heating system. Installation of additional facilities which the Navy had underway in May included a second boiler to supplement the original Kewanee, a gas-fired boiler for supplying hot water for dish-washing purposes, a second pump, and eight additional fans to supplement the original distribution system. The second boiler, which is being installed next to the Kewanee, is a Cliff Loline gas-fired unit of the same size and type as the Kewanee.

The complete heating system for the entire building is expected to be ready for use by early fall.

Treasury Department Defense Savings Staff

The American people are saving at the rate of $100,000,000 a week!

This is not somebody's wild guess, but an official announcement by the Treasury Department, that Americans are giving Uncle Sam $100,000,000 a week to save for them—and receiving in return Defense Savings Bonds and Stamps.

Bankers, businessmen, bakers, farmers, factory workers, shop girls, housewives—virtually all American men, women and children from all walks of life—are cooperating in the Government program to build up a rainy-day reserve. In many states, employers are establishing systematic savings plans in cooperation with their employees. Labor and industry both have endorsed the Savings Program of the Government. Nevertheless, there are still many who ask: Why? What is the reason for National thrift undertaking.

The reasons are manifold. Strange as it seems, with war all around us, America is preparing for peace. In this period of unlimited emergency, vast requirements are being made of industry by the Federal Government. Wheels are turning at top speed to produce the weapons of defense—weapons that will assure and protect the freedom and safety of the nation. As a result, the national income is jumping sharply. Wages and salaries are increasing. So, too, is employment. Money is more plentiful.

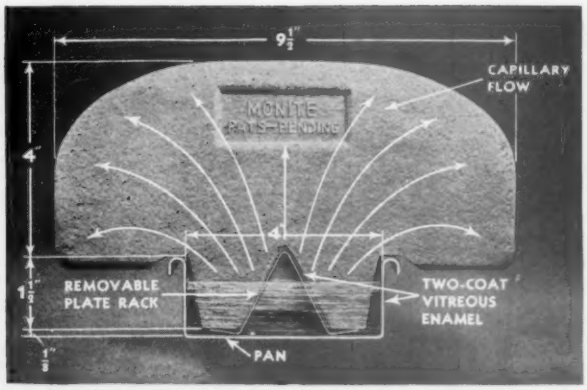
If the country spends a lot of money now, there may be a let-down afterwards. The Defense Savings Program of the Treasury Department involves the sale of Federal securities to as many people as possible in an effort to build as large a reserve as possible against any slump which follows the end of America's all-out war production.

The cash involved in the purchase of Defense Savings Bonds is put to work at once to protect the freedom of the country. At the same time, the bond protects the individual against financial consequences of a post-war readjustment. Thus, the program achieves a two-fold purpose.

There are three types of Defense Savings Bonds. The Series E Bonds may be bought for $18.75, $37.50, $75, $375 and $750. They grow in value in ten years to $25, $50, $100, $500 and $1,000, respectively.

Series F, also an appreciation bond, is issued at $74, $370, $740, $3,700 and $7,400. These bonds mature in 12 years to $100, $500, $1,000, $5,000 and $10,000.

Series G is designed to meet the demand for a current income bond. These are issued at par and may be purchased in denominations of $100, $500, $1,000, $5,000 or $10,000. Series G Bonds bear interest of 2.5 per cent paid semi-annually.



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THE ORIGINAL VAPORIZING PLATE. Seven years ago their introduction revolutionized humidification. Steadily improved ever since. Widely imitated but never equaled, because Monmouth's long experience and engineering leadership remain unmatched.

SUPERIOR MATERIALS. Made of Monite ceramic material; granular, *not* fibrous. This insures 100% capillarity due to scientifically correct, uniform pore size. Unlike vegetable base plates, they cannot rot or become moldy. Resist iron-melting heat, acids, alkalies.

SCIENTIFICALLY PROPORTIONED. Unlike inferior plates which are punched from thin sheets or sawed from bricks, Monmouth plates are individually die molded. This permits correct cross sectional areas and thicknesses at all points, insuring greatest evaporation and lime holding capacity.

DURABLE AND CONVENIENT. After one to four years' service, lime can be easily washed out with water to which Monmouth non-acid chemical crystals have been added. Restores full capillarity. Can be repeated indefinitely.

LARGEST EVAPORATING CAPACITY. Due to superior materials and proportions, Monmouth plates can be made larger than any others, thus giving from 2 to 8 times more capacity. They give you the greatest evaporating capacity per dollar ever offered.

All these and many other superiorities make Monmouth Plates the peer of all humidification plates.

FREE! CAPACITY INDICATOR. Handy, pocket-size indicator instantly tells you how many plates any humidification installation requires. Saves time, ends guesswork. Write for **your** copy **now.**

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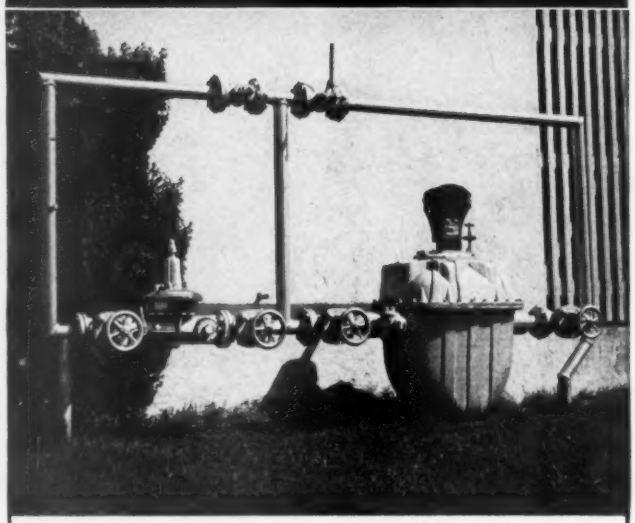
The Greatest Name in Humidification

REYNOLDS Regulators DELIVER* the REQUIRED PRESSURE



Rice Mill in South Texas

In a Rice Mill, accuracy in the heat reaching the burners is as important as in a heat-treating metal plant. In the above installation the Reynolds Regulator reduces the inlet pressure of 25 pounds to five pounds to the burners.

REYNOLDS builds a regulator for every type of Gas Control Installation. Proved by records of performance in actual operation, or by records of factory tests on new developments, every REYNOLDS unit—whether for high pressure or low—is a proved product.

Long life, efficient operation, accurate regulation, reasonable cost, low upkeep—these are the vitally important inherent features built into REYNOLDS Gas Regulators through nearly 50 years of experience in developing, designing, building and testing Gas Control equipment.

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GAS CONTROL SINCE 1892

RECENT COURT DECISIONS Affecting Gas Utilities

Validity of Gas Contracts

By
Leo T. Parker
Attorney at Law
Cincinnati, Ohio

MODERN higher courts recognize the fact that the transportation and distribution of natural gas is a business that should *not* be immune from competition, under certain conditions, rather than a regulated monopoly. Natural gas is found beneath the earth's surface and it is the subject of discovery and capture, which fact brings into the business the element of hazard and risk. Therefore, the fact that one is engaged in the business of producing or buying, transporting and distributing gas should not alone eliminate him from competition from a new field of natural gas which might be discovered, produced and sold to existing consumers at a much cheaper rate, because of cost of production proximity to the existing market or a better grade of gas because of a higher B.T.U. content. Therefore, the element of cost, although not necessarily of itself sufficient, is a very important one for the company to consider in determining whether the public convenience and necessity will be served.

In other words, an offer, coupled with the ability of a gas corporation to produce and sell gas, at a lower rate than that presently being charged for gas, is an important element for consideration of the court in determining whether a permit should be issued to an applicant who intends competing with a gas corporation now in the same field and which presently serves the same consumers intended to be served by the new applicant. Notwithstanding the fact that old higher court decisions hold to the contrary, modern law is different. In order to clearly impart the modern law on this subject, we shall review in detail the higher court case of Department of Public Utilities v. Arkansas Louisiana Gas Company, 142 S. W. (2d) 213, reported August, 1940.

The facts of this case are that on March 20, 1939, the Louisiana Nevada Transit Company filed with the Public Utilities Commission an application for a certificate of convenience and necessity to construct, maintain and operate a natural gas pipe line in northern Louisiana, to the Ideal Cement Company at Okay, Arkansas, a distance of about 75 miles. The basis of the application was a contract with the Ideal Cement Company to supply it with natural gas for the manufacture of cement. Later the Louisiana Company amended its application so as to be permitted to construct a branch from its proposed line to Hope, Arkansas, so as to serve the Municipal Water and Light Plant and the Hope Brick Works, with which it had contracted to furnish gas at ten cents per 1000 cu. ft. It also offered to serve the towns of Bradley, Fulton, McNab and Saratoga, on or near its proposed line, at 45 cents per 1000 cu. ft.

On July 28, 1939, Arkansas Louisiana Gas Company filed a petition in which it alleged that it was a Delaware corporation doing business in the states of Arkansas, Louisiana and Texas, with its principal operating office at Shreveport, Louisiana; that it owned and operated an integrated natural gas system, producing, transporting and distributing natural gas through a pipe line system of more than 1,500 miles of main line; that it served 62 communities with approximately 44,000 customers in Arkansas, 23 communities with 28,000 customers in Louisiana and 18 communities with 8,000 customers in Texas; that it also served some industrial customers in said states from its main transmission line; that in 1938, it sold a total of 38,358,385 MCF of gas, of which 22,394,939 MCF of gas were sold in Arkansas; and its total system revenue for the same period was approximately $8,150,000 of which $4,856,000 came from Arkansas business. It further alleged that the construction of the Louisiana Company's line was not a matter of public convenience and necessity and that the public interest would be adversely affected if the application were granted.

After carefully considering all testimony the lower court reversed the order of the Public Utilities Commission and refused to grant the permit to the Louisiana Company. However, it is important to know that the higher court reversed the lower court and held that the Louisiana Company could legally install its service for cheap gas. This higher court stated the following important law:

"It is contended, and we think correctly, that since there is no claim by appellee (Arkansas Louisiana Gas Company) that the order of the Department complained of violated any of its constitutional rights, the review of such order 'shall not extend further than to determine whether the Department has regularly pursued its authority.' But this does not mean that the courts cannot inquire beyond mere formality. . . . The proceedings before the Department might be regular in all respects, and still its order might be illegal and void as being arbitrary, unreasonable, without any substantial evidence to support it, or in fraud or in corruption. . . . In other words, if the Public Utilities Commission's order is supported by substantial evidence, free from fraud, and not arbitrary it is the duty of the courts to permit it to stand, even though they might disagree with the wisdom of the order."

Another important point of law involved in this case was whether the Louisiana Company could supply services to customers being supplied by another gas company. This court said:

"Certain facts are undisputed. Applicant (Louisiana Company) has filed with the Department a certified copy of its articles of incorporation; copies of the contracts it has made with the

three industrial consumers it proposes to serve; and has satisfied the Department of its financial responsibility and managerial ability, of the abundance and quality of its supply of natural gas. The City of Hope is, naturally, very much interested in the prospect of cheaper gas rates for its Municipal Light and Water Plant, as also the Hope Brick Works."

Readers must not overlook the fact that the legal effect of state and Federal laws and also contract relationship must be considered. And it is well known that a majority, if not all, of these laws authorize the Public Utilities Commission, or other department, to regulate the service and rates of utilities under its jurisdiction. Generally speaking, before engaging in the utility business or beginning any new construction, or extension therefor, an application must be made for a certificate that the "public convenience and necessity" require, or will require such construction or operation. And, as indicated by the above higher court case, modern courts importantly consider the desirability of cheap gas when deciding whether a permit shall be granted.

Validity of Municipal Contracts

Various higher courts have held that two fundamental principles of law, applicable to municipalities are: Municipalities possess no power except that expressly conferred by state laws, or that which is necessarily implied in order to carry out the expressly conferred authority; and charters of municipal corporations occupy the same relation to the municipality as does a constitution to a state.

Other higher courts have consistently held that a municipality is a creature of the Legislature and it can only exercise (1) the powers granted by state laws in express terms; (2) those necessarily or fairly implied or incident to the powers expressly granted; and (3) those essential to the accomplishment of the declared objects of the corporation.

However, a contract made by properly authorized municipal officials may be valid and binding, and the city will be held liable in damages for failure to fulfill the obligations assumed in the contract providing, of course, the contract is valid.

The courts have consistently held that a municipal contract is valid if the obligations of both contracting parties are definitely fixed; the object of the contract is legal; both contracting parties have proper authority to make the contract; the duration of contract is clearly specified; the quantity and quality of material is clearly indicated; the parties are mutually obligated to perform one or more acts; and the contract is not in violation to a state or city law.

For illustration, in Laharpe Company v. City of Iola, 105 Pac. (2d) 900, reported October, 1940, it was disclosed that in 1932 a gas company and a municipality entered into a written agreement under which the gas company agreed to sell and the city agreed to purchase fifty million cubic feet of natural gas per year at the price of twenty-five cents per thousand cubic feet. The contract was to remain in force for five years, or to March, 1937.

The contract provided that it was understood that the city has already contracted with the Oklahoma Natural Gas Corporation for the purchase of a minimum of one hundred ten million cubic feet of natural gas per year with a minimum during the months of May, June, July, August, and September of one hundred twenty-five thousand cubic feet per day, and that "should the requirement of the city not equal the said fifty million cubic feet per year, over and above the minimum requirements of the Oklahoma Natural Gas Corporation contract, then the amount to be purchased under this contract shall be reduced accordingly."

After expiration of the contract the gas company sued the city for damages on the contention that in several months during the five-year period the city had not taken the amount of gas specified in the contract.

The counsel for the gas company alleged that during the term of the contract it maintained a sufficient supply of gas to comply with all the requirements of the contract, and that it was entitled to damages in an amount equal to the selling price of 25 cents per 1000 cu. ft.

The counsel for the city contended that the contract sued on was void for the reason that the record fails to show a certificate of convenience was issued to the gas company; that it has delayed in filing the suit; and that the amount of damages could not be based upon 25 cents per 1000 cu. ft. of gas because this was the full price which the city would have paid for the gas had it complied with the contract. Notwithstanding these contentions, the higher court held the city liable, saying:

"The court made no findings as to whether the plaintiff (gas company) had or did not have such certificate, or whether it was a corporation required by law to have such certificate. . . . It is contended that the claim against the city was not in proper form, and that the delay in filing such claim promptly 'constituted such inexcusable delay or laches as to estop claiming damages in this action.' We find no merit in these contentions. . . . The court finds that as there was and has been no market for said gas that the damages sustained by the plaintiff (gas company) on account of the failure of the defendant (city) to take said gas as provided in the contract, is the sum of 25 cents per thousand cubic feet; that its damage is in the total sum of $6,190.75."

Law of Ambiguous Contracts

The higher courts in all states agree that a restriction, variation, or modification in a contract is valid and enforceable. Also, both the purchaser and seller are bound by the terms of a guarantee, providing when the contract was made both *intended* to be bound by the guarantee.

It is well to realize that a seller is not liable for fraud or misrepresentation where he merely states his own opinion regarding the quality of merchandise. And conversely a recent higher court held a seller liable to a purchaser for fraud where it was shown that the former purposely remained *silent* about certain defects of the merchandise, thus deceiving the purchaser. This court said:

"A seller may not do anything to conceal from the other a material fact, or say or do anything to divert or forestall an inquiry by him or deliberately hide defects or other facts, for in so doing he is not merely remaining silent, but is taking active steps to mislead." (See 134 Atl. 62).

Frequently, litigations involving contracts for sale of gas require considerable testimony. Now, therefore, in consideration of the almost endless and expensive litigation which may result from ambiguous contracts it is obvious that both buyers and sellers of gas should enter into clear and understandable *written* contracts.

Of course, if a person, firm or corporation purchases gas it is entitled to the gas and other products which may be therein at the time of delivery.

For example, in Union Company v. Pardue, 117 F. (2d) 225, reported February, 1941, it was disclosed that a gas corporation contracted to purchase a stipulated quantity of

(Concluded on page 46)

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THE REPUBLIC
GRADIENT-HEET BURNER
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WITH
THE GAS INPUT
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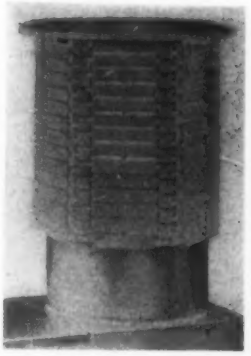

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Unequalled efficiency and economy on any type of gas fuel.

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Wide range of sizes, both round and square type burners —all easily adjustable to fit properly *any* furnace or boiler.

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THE BARBER GAS BURNER CO.
3704 Superior Ave. Cleveland, Ohio

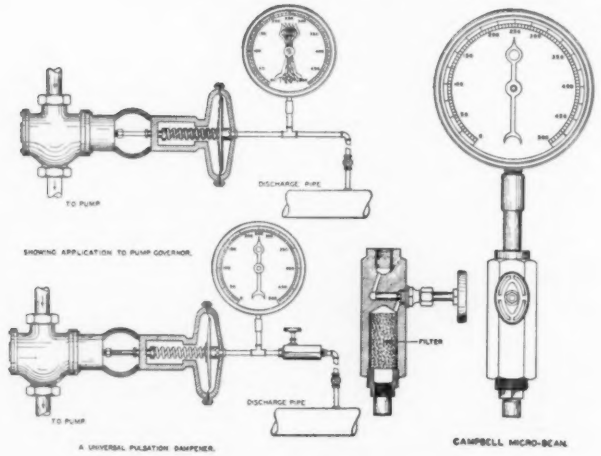
BARBER *Automatic* JET GAS BURNERS

New Equipment

Micro-Action Valve

For dampening the pulsation of boiler plant pump governors and to eliminate "jitters" of the gauge hand, the Campbell Micro-Bean has been developed by J. A. Campbell Co., Long Beach, California. It can be installed on the pressure line to the diaphragm of a pump governor for protection of the pressure gauge mechanism and tube, also the spring, diaphragm and stem packing. It is also effective as protection to any control valve, such as a back pressure or reducing regulator and for use with sensitive control instruments subjected to pulsating flow. The valve will handle steam, fuel oil, gas, water or other liquids, with simple adjustment for each viscosity.

The device is universal in application for varied purposes up to 3000 lbs. pressure and will give any degree of stabilization desired by merely turning the valve.

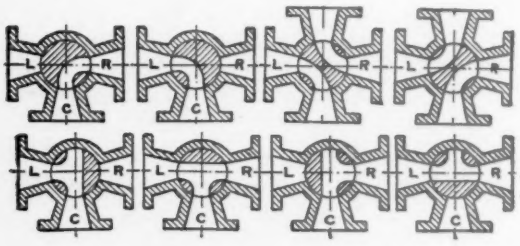


Development of Multiport Valves

Various port and stop arrangements provided by Multiport valves are presented in a new bulletin, V-135 issued by Merco Nordstrom Valve Company, 400 Lexington Ave., Pittsburgh. Ground plans are shown of the arrangements effected by 3-way, 2-port; 3-way, 3-port and 4-way, 4-port valves at various degrees of turn, 90°, 180° and 270°. Illustrations of the different types of Nordstrom Multiport Valves are shown, with specification tables.

Multiport valves permit quick switching from line to line. One valve can do the work of two, three or four ordinary valves, according to the arrangement of flow-ways and ports and degrees of turn. Sizes range from ½" to 16", for pressures tested to 3000 lbs.

For high temperature services and where extremely corrosive or erosive line contents are handled, the Multiport type may be furnished with Merchrome coating. This coating presents an extremely hard surface which prevents galling and abrasion regardless of line contents or temperature.



Merco Nordstrom Multiport Valves

New RegO Combination Valves

The new RegO 2580 and 2581 LP Gas Valves, manufactured by The Bastian-Blessing Company, 242 East Ontario Street, Chicago, Ill., are designed especially for use with permanently installed ICC cylinders and ASME or API-ASME above-ground containers. They are suitable for use with either flash or batch vaporization.

This series of RegO valves embodies in one simple assembly all of the following safety and utility features: shut-off valve for outlet connection; excess flow check valve for outlet connection; automatic quick filler valve and back pressure check valve; supplementary back pressure check valve; safety relief valve; fuse plug; fixed liquid level gauge and vent valve; variable positioning container inlet connection; and liquid eduction outlet tube. Only one connection is required in the container.

The RegO 2581 Valves are also equipped with elbow outlet adapters and loose rain caps on the safety relief valve and at the fuse plug discharge.

New Perfex Gas Valve

A "Thermo-Draulic" Gas Valve has been recently developed by Perfex Corporation, 500 West Oklahoma Ave., Milwaukee. Controlled by a room thermostat or other de-

Perfex Gas Valve

and Appliances

vice, this instrument regulates gas flow to the burner. Operation is stated to be absolutely silent.

The valve disc is opened by an expanding liquid in the thermodraulic element. This liquid is heated by an external coil, energized by the controlling instrument. A notable safety feature is that in case of power failure, broken wire or possible damage to the thermodraulic element, the valve will immediately return to the closed position.

Lubricating or other periodic service is not required. Cleaning is rarely necessary, and in such cases, either the power element or the valve disc can be removed without disconnecting the piping. Models are designed for AC or DC power supply, for low or line voltage, with or without manual opening and automatic recycling feature.

Reed Pipe Tools

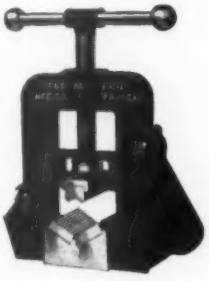
Reed Manufacturing Company of Erie, Pa., describes in recently issued circulars two of their items as follows.

Reed Ratchet Stock

A removable head ratchet type of stock, consisting of die holder and guide which has several exclusive features.

These include the opportunity for handling the ratchet when working in restricted spaces. Two pawls, acting alternately, reduce lost motion and permit the use of the stock in any restricted space.

The dies are designed to thread iron, steel or brass equally well. Right or left hand, pipe or bolt dies can be used. Described fully in folder 64.



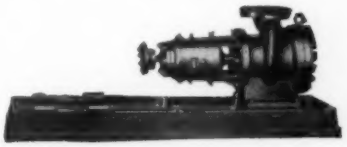
Long Jaw Pipe Vise

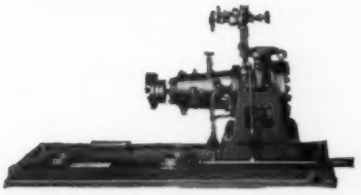
The Reed Long Jaw Pipe Vise illustrated herewith is claimed to grip positively with less effort than the old style jaw vise. The lower jaws are reversible when wear makes this necessary. The long jaws distribute the pressure so as to reduce the tendency to mar the pipe. A handy pipe bender for pipe sizes up to ¾" is included.

This type of vise is made in 5 sizes for pipe diameters from ⅛" to 4½". Fuller description in their folder No. 70.

"Pacific" Service Pumps

A new line of General Service Centrifugal Pumps has been announced by the Pacific Pump Works, Huntington Park, California. These are designed for all types of service to meet a wide variation in pumping conditions. They can be used both for ordinary general service application and for extremely





high temperature down to sub-zero temperatures, handling both heavy and light liquids. Capacities range from 25 G.P.M. to 1400 G.P.M. against discharge pressures up to 300 lbs. Pumps are designed for maximum casing working pressure of 600 lbs., and are suitable for handling liquids up to 750°F. at speeds ranging up to 3600 R.P.M.

Pumps supplied for cold service are foot-mounted, as shown in the upper illustration. Pumps for hot service are centerline-mounted, as shown in the lower. The Pump for hot service is arranged with water-cooled bearings, stuffing boxes and base pedestals, — including provisions for removable lagging, if desired.

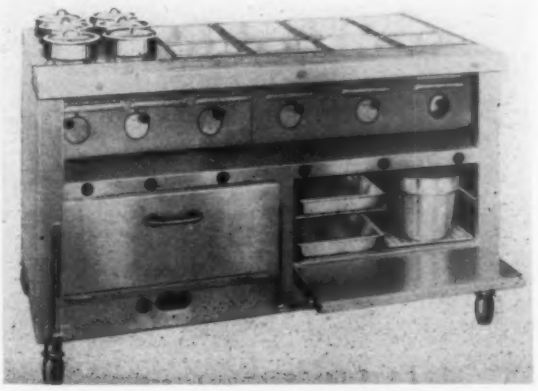
Gas Heated Serving Table

The adjoining photograph illustrates a special Series "A" Sectional Control "Thermolator" Waterless Gas-Heated Hot Food Storage and Serving Table together with surplus food storage compartments built into the base of the fixture.

The upper unit consists of a dry-heat hot food serving table with a recessed shelf below the carving board which may be used for the storage of plates during the serving periods. Each section has its individual burner pilot and indicating valve and may be obtained with or without visual thermostatic control. Because of this construction sections may be operated independently during off periods. Water pans, steam and waste connections are eliminated making installation unusually flexible.

The lower compartments are fitted with removable shelves arranged to accommodate two large-size meat pans, as illustrated, or a number of soup or vegetable insets. These storage compartments are fitted with an adjustable control, gas burning arrangement, similar to the type used in the upper compartments, and the foods may be stored at the proper serving temperatures until ready to be used.

Manufactured by Ershler & Krukin, Inc., Bayonne, N. J.



Hot Food Storage and Serving Table

Book Reviews

The Resistance of Anthracite to Mechanical and Thermal Shock, by C. C. Wright, L. L. Newman and A. W. Gauger. Mineral Industries Experiment Station Bulletin 31, The Pennsylvania State College, State College, Pennsylvania. Price 50 cents.

Because of the demand for coke by essential defense industries, many water gas plant operators have given consideration to the use of anthracite for generator fuel.

Those who have used anthracite in a water gas generator know that one of the most important problems encountered is that of mechanical and thermal decrepitation. Not only does the breaking up of the lumps reduce the blasting rate, and hence capacity, with a given blower pressure, but the smaller particles are apt to be carried over to the dust catcher. Some operators, in fact, have questioned whether anthracite could be used satisfactorily in modern sets under modern practice.

This bulletin is the first of a series of three dealing with the subject of anthracite for water gas generator fuel. The other two will cover actual plant tests using heavy oil and light gas oil respectively.

In the bulletin just published a laboratory method is described in detail whereby the size stability of anthracite which has been subjected to thermal and mechanical shock can be determined. The conditions of shock chosen for this test simulate closely those experienced by water-gas generator fuel. Detailed data are shown for the size composition of a variety of grate, broken, and egg-size anthracites after varying shock treatments.

Data are shown for the effect of from one to four drops in the standard drop-shatter test for comparison with size stability data on coke. Curves are also shown which indicate the effect of time of heating upon the size stability and ability of the coal to withstand subsequent mechanical shock.

For purposes of application to deep fuel beds, the data have been calculated to indicate relative fuel-bed resistance and amount of potential blown-over fuel for blast rates normally experienced in water-gas generators. Data are shown for size composition and amount of blown-over fuel obtained in a number of water-gas plants using anthracite, and reasons presented to show why only a small percentage of potential blown-over fuel is actually recovered as such in plant practice.

Calculated and experimental data for increase in pressure drop through a water-gas generator resulting from decrepitation of the coal as presented, and show excellent agreement. The experimentally determined values agree closely with the results for single-drop shatter by laboratory test methods.

Calculated and experimental data for overall pressure drop through a water-gas generator are presented and show substantial agreement, a further indication that the results of laboratory test are indicative of actual plant results.

Definite conclusions are reached respecting the importance of decrepitation of the generator fuel in the operation of a water gas set.

Lessons in Arc Welding, published by The Lincoln Electric Co., Cleveland, Ohio; 176 pages, 6 x 9 inches; 170 illustrations; price 50 cents per copy, postpaid anywhere in U.S.A., 75 cents elsewhere.

This book makes available to industry and to engineering colleges and universities, also trade and vocational schools, the accumulated welding instruction information from The Lincoln Welding School, which has been in continuous operation for 24 years.

Lessons in Arc Welding is a series of 60 lessons which present in concise manner, fundamental facts of welding, knowledge of which will enable the welder to utilize the process successfully and economically.

The lessons begin with an introduction giving preliminary instruction to the welder. They include suggestions for making and following a definite plan for learning the fundamental principles of arc welding, and for practicing continually, examining welds, criticizing and inviting criticism of work, for wearing proper protective apparel at all times, and assuming proper working positions.

A valuable feature of the book is the set of questions and answers for each lesson enabling the student to check his knowledge. This question and answer section is contained in 25 pages with 18 pages of questions and 7 of answers.

Helpful to beginners learning to arc weld, also to experienced welders desiring its comprehensive practical information, and to welding officials, such as supervisors, foremen and instructors, as well as others interested in the subject, the book comprises a ready reference on arc welding and a guide to its proper application. It will be found valuable, at this time, to any industrial organization faced with the necessity of training its own welders to meet demands imposed by the National Defense program.

Lessons in Arc Welding may be obtained directly from The Lincoln Electric Co., or through any of its branch plants, dealers or representatives, or through any recognized book dealer.

Methods of Analysis of Coal and Coke, first American edition, Chemical Publishing Company, Inc., Brooklyn, N. Y. 1941. 85 pages. Price $1.50.

The methods described in the book were evolved by the British Fuel Research Board of the Department of Scientific Research for use primarily at the Department's Fuel Research Station and its Coal Survey Laboratories, where a high degree of accuracy is required. They are published so as to be available to others who may require this high standard, as well as to provide a record of part of the Department's researches. They do not differ fundamentally from the corresponding methods given in the latest specifications of the British Standards Institution, and in fact the Fuel Research organization cooperates in the preparation of these specifications. Such differences as exist are explained by the different purposes of the British Standard Specifications which is to provide reliable methods for industrial application in the buying and selling of coal and in the carrying out of performance and efficiency tests on plants consuming coal. In general, the present Fuel Research methods give more explanatory details than the specifications, and certain methods are included for which there are at present no British Standard Specifications.

R. M. Cleveland Succeeds W. A. Finn as Worthington's Boston Manager

Worthington Pump and Machinery Corporation announces the appointment of R. M. Cleveland, a veteran of twenty-four years service with the organization, as Manager of its Boston office. He succeeds W. A. Finn who has been called to active duty with the Navy in the rank of lieutenant.

Mr. Finn has been with Worthington since resigning his commission as a Naval officer in 1926.

New Propane Plant of Dominion Natural Gas Co.

Work is progressing rapidly on the Dominion Natural Gas Co. Ltd.'s new propane plant located near Brantford, Ontario, and the auxiliary compressors at Blackheath and Caledonia. Completion is planned for early Autumn. The plant will be used to supplement the supply of natural gas during the winter peak demand periods.

Under ordinary pressure and temperature conditions, propane is a gas having a heating value of approximately 2550 B.T.U.'s per cubic foot and a gravity of 1.52. Propane, however, is transported and stored as a liquid under pressure. At 105°F. its vapor pressure is approximately 200 lbs. per square inch—hence the storage vessels must be able to withstand a pressure about twice this amount. When the pressure of Propane is reelased it immediately changes its liquid state to that of a gas.

Natural gas has a heat value of approximately 1000 B.T.U.'s per cubic foot and a gravity of about .60. Since all of the gas burning appliances on the Dominion System are adjusted for Natural Gas, the use of propane as a supplement for and to Natural Gas must be made under this condition. Before the use of propane was definitely decided upon, extensive tests in different appliances were made using variable proportions of propane gas, natural gas and air. The dilution of the propane gas with air and natural gas was necessary to reduce the heat value of the usable mixture to one approaching natural gas and to reduce the gravity of the mixture. During the periods when propane is being introduced into our mains, the customers will never receive less than 1000 B.T.U. gas and sometimes the gas will have a higher heat value.

The Brantford Plant will consist primarily of propane storage to the amount of 200,000 Imperial gallons, a 225 H.P. Cooper-Bessemer compressor unit for air and propane vaporizing and mixing equipment. The Blackheath and Caledonia compressors are required for transporting the necessary amount of natural gas to the Brantford plant for mixing with propane. The Blackheath Plant will consist of a 135 H.P. Reeves engine and Hall Compressor and the Caledonia Plant will have a 250 H.P. Miller engine and Bury Compressor.

One interesting innovation and departure from ordinary practice is being used at the Brantford plant for propane storage. Ordinarily tanks with a diameter of 8-10 feet and length of 30-40 feet are used. At Brantford, however, the storage tanks will be constructed of 24 inch seamless line pipe and each tank or tube will be approximately 425 feet long. Stronger tanks thus result at a considerable saving in cost.

When ready to operate, the Brantford Plant will have a daily capacity of 5,000-6,000 M.C.F. daily of natural gas equivalent. The cost of this gas will be approximately $1.50 per M.C.F. which is greater than the price received by the company for the same from its customers. The cost of this gas, without profit to the company, will be borne by an emergency increase in rates of from 4-6 cents per M.C.F.

Utility Priorities for Repair and Maintenance

Increasing demands, including priorities issued for defense requirements, have made it difficult for many public services and industrial processes to secure needed repair and maintenance materials and equipment.

The office of Price Administration and Civilian Supply (Leon Henderson, Administrator) issued, June 30, an allocation program whereby materials and equipment necessary for maintenance and repair in connection with 26 listed essential industries and services shall be allocated to such use prior to the satisfaction of other competing civilian demands, and prior to defense requirements to the extent consistent with the defense program as determined by the Office of Production Management.

The following essential industries are given priorities accordingly:

Oil and gas pipe lines; Manufactured gas and natural gas production and distribution; Petroleum production and refining; Electrical energy and production; Industrial and academic research; Production of chemicals.

AVOIDANCE OF EXCESSIVE INVENTORIES. Allocations made under this program shall not be used to accumulate excessive inventories, or to divert parts still serviceable.

DEFINITIONS. As used herein, the term "maintenance" means the upkeep of property and equipment, and the term "repair" means the restoration of property and equipment to a sound state after wear and tear, damage, destruction of parts, or the like. These terms include replacement of parts which have been worn out, damaged or destroyed, but do not include replacement when the new part or parts represent a changeover in model, the introduction of superior type equipment to replace usable equipment of an older or inferior type of design, or a substitution more extensive than that which is necessary to replace the part or parts that are worn out, damaged or destroyed.

ENFORCEMENT. The foregoing program is to be administered and enforced by the Office of Production Management.

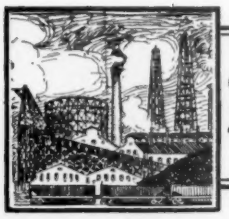
Natural Gas Demand Causes Extension of Telephone Line

United Gas Pipe Line company this week started construction on 80 miles of telephone line running from a point near Hattiesburg, Miss., to Mobile, Ala., according to an announcement by company officials.

The new line will follow the course of United's main natural gas transmission line between Jackson and Mobile and will connect stations along that line with Jackson and other points on the company's more than 3000 miles of main telephone line. The increasing demands for natural gas by industries, many of which are engaged in filling National Defense orders, and the growth of the towns along the line made construction of the telephone line necessary to facilitate deliveries and communication along the pipe line.

Headquarters have been established at Lucedale, midway point on the line and materials are being unloaded and distributed from this point. At present, crews are completing the surveying of railroad, highway and river crossings.

The project is under the supervision of John G. Trilsch of Shreveport, engineer in the telephone and telegraph department of United.



News of the Gas Industry

A. G. A. Nominations for 1941-1942

The General Nominating Committee of American Gas Association report that the following will be presented at their annual convention in Atlantic City in October.

For President—George S. Hawley, President, The Bridgeport Gas Light Company, Bridgeport, Conn.

For First Vice-President—A. F. Bridge, Vice-President and General Manager, Southern Counties Gas Company, Los Angeles, California.

For Treasurer—Ernest R. Acker, President, Central Hudson Gas and Electric Corporation, Poughkeepsie, New York.

For Directors—2-year terms: Walter C. Beckjord, Vice-President and General Manager, Columbia Gas & Electric Corporation, New York.
C. M. Cohn, Executive Vice-President, Consolidated Gas Electric Light & Power Company, Baltimore, Maryland.
Watson E. Derwent, Vice-President, Geo. D. Roper Corp., Rockford, Ill.
H. L. Dickerson, Director, Ebasco Services Inc., New York.
Ralph L. Fletcher, Vice-President, Providence Gas Co., Providence, R. I.
R. H. Hargrove, Vice-President and General Manager, United Gas Pipe Line Company, Shreveport, La.
D. A. Hulcy, President, Lone Star Gas Corporation, Dallas, Texas.
Bruno Rahn, President, Milwaukee Gas Light Company, Milwaukee, Wisconsin.
Louis Ruthenburg, President, Servel, Inc., Evansville, Ind.
E. J. Tucker, General Manager and Secretary, Consumers Gas Co. of Toronto, Toronto, Ontario.
H. Carl Wolf, President, Atlanta Gas Light Company, Atlanta, Georgia.

The following have been nominated by section nominating committees to serve as section chairman for the next Association year:

Accounting Section: Chairman—Lyman L. Dver, Lone Star Gas Company, Dallas, Texas.

Industrial and Commercial Gas Section: Chairman—George F. B. Owens, The Brooklyn Union Gas Company, Brooklyn, New York.

Manufacturers Section: Chairman—John A. Robertshaw, Robertshaw Thermostat Company, Youngwood, Pa.

Natural Gas Section: Chairman—J. French Robinson, The East Ohio Gas Company, Cleveland, Ohio.

Publicity & Advertising: Chairman—Charles A. Tattersall, Niagara Hudson Power Corporation, New York.

Residential Section: Chairman—E. J. Boyer, Minneapolis Gas Light Co., Minneapolis, Minnesota.

Technical Section: Chairman—Harold L. Gaidry, New Orleans Public Service Inc., New Orleans, La.

Plans Completed for Appalachian Meter School

Mr. A. F. Kraus, Superintendent of Gas Measurement of the Peoples Natural Gas Company of Pittsburgh, Pa., in his capacity as Chairman, has extended a cordial invitation to all in the gas and oil business and to those in other industries interested in measurement and regulation to attend the Appalachian Gas Measurement Short Course at West Virginia University, at Morgantown, West Virginia on August 18, 19 and 20, as announced in the July issue.

The primary aim of the school is to present, discuss and illustrate the various problems in measurement and control of gas so that each person attending may gain practical knowledge which will help in the performance of his tasks.

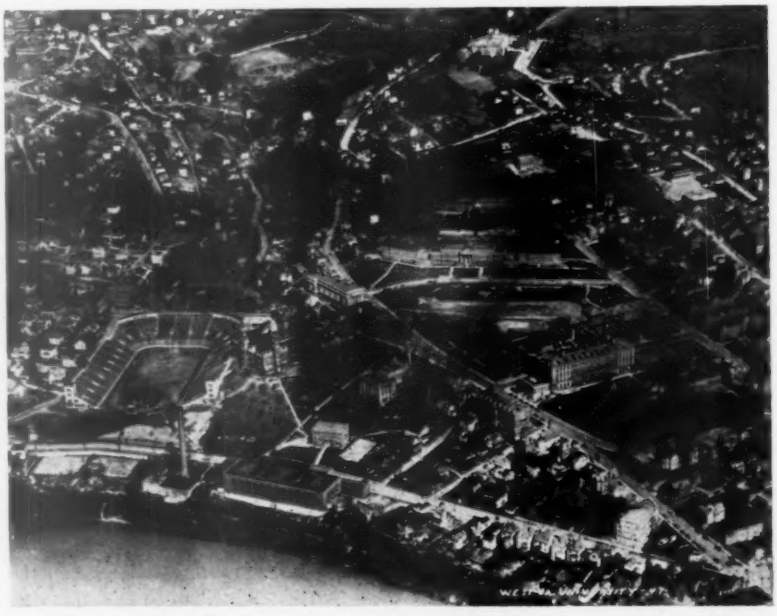
According to Mr. Kraus, an outstanding list of speakers has been secured for the various sessions. General meetings will be held each morning in the large assembly hall where those present will be privileged to hear recognized authorities speak on various economic aspects of gas measurement and regulation. Those speakers include Dr. C. E. Lawall, President of West Virginia University; C. C. Reed, Hope Natural Gas Company; Dr. Reginald L. Wakeman, Mellon Institute of Industrial Research; Dr. R. C. Colwell, Physics Department, West Virginia University; Judge E. B. Pennybacker, Chairman, Public Service Commission of West Virginia; William A. Ehlers, Reynolds Gas Regulator Company; T. H. Kerr, The Ohio Fuel Gas Company; A. D. MacLean, Pittsburgh Equitable Meter Company; D. P. Hartson, Pittsburgh and West Virginia Gas Company; E. H. Poe, Secretary, Natural Gas Section of the American Gas Association, and A. F. Benson, American Meter Company.

Classroom sessions of one hour and fifteen minutes each will be conducted afternoons by gas company engineers and representatives of the equipment manufacturers.

Monday evening registrants at the School will be entertained with a boxing show while the annual dinner will be held Tuesday evening in the Hotel Morgan Ballroom.

Meeting of Michigan Gas and Michigan Electric Light Association

At the combined meeting of these two Associations held at Mackinac Island early in July the following officers of Michigan Gas Assn. were elected for the ensuing year. President, Henry Fink, Michigan Consolidated Gas Company, Detroit; Vice President, M. Wilson Arthur, Consumers Power Company, Jackson; Secretary-Treas., reelected, Albert G. Schroeder, with offices at 47 North Division Avenue, Grand Rapids.



Airplane View, West Virginia University Campus where Meter School will be held this month.

American Gas Association Annual Meeting

The annual meeting of the American Gas Association will be held in Atlantic City, N. J., on October 20, 21 and 22, 1941.

Because of the tremendous increase in activities incident to the national defense program and other exigencies affecting our situation, A. G. A. headquarters announces that the program will be brief, pertinent and inspiring. Naturally, no entertainment is provided, as this will be strictly a business gathering, although there will be subscription luncheons and dinners.

Sectional programs, fewer in number, will be so arranged that the splendid meetings of the past will continue in importance and interest to those most concerned with Sectional activities.

It is believed that with the constantly increasing effort and enthusiasm diverted to our country's welfare, company members will appreciate this arrangement, especially in the light of the greater demands of the times.

Details of the program will be made available to members as soon as they are formulated.

N.A.M. Committee on Healthful Working Conditions Issues Report

Recognizing industry's responsibility for working conditions, almost four years ago the National Association of Manufacturers organized its Committee on Healthful Working Conditions to study the problems involved in maintaining the maximum degree of health among workers and to assist in all ways possible to bring the solutions of these problems into more widespread being.

The survey, of which this pamphlet—"Industrial Health Practices"—is the report, contains replies from over 2,000 plants throughout 47 states, employing almost 2,000,000 workers. Much valuable information regarding the value, use, age and cost of such health programs, as well as regarding industrial physical examination practices, has been revealed through this study.

Single copies of the booklet are available free to NAM members and nonprofit organizations, but a charge of 50c a copy is made to all others Special prices are quoted for quantity orders.

Natural Gas in Michigan

The Michigan Public Service Commission has approved the petition of Consumers' Power Company to service sixty-six municipalities with natural gas from Texas and Kansas. The commission approved a 15-year contract between the utility and Pan-Handle Eastern Pipeline Company requiring at least 70% of the salable mixture be from Texas and Kansas. The order estimates a sufficient supply from the foreign field for 25 years. The new temporary rates accompanying the order would result in a 21% reduction to 122,000 domestic and 6,557 commercial customers on the average, an annual reduction in company revenue of $1,000,000. Space-heating rates will be reduced approximately 38% for 359 customers. The order calls for the pipeline company to spend $4,633,000 for a line to bring the gas to Michigan and for the company to spend $246,000 to connect the line to its existing Michigan line.

CONVENTION CALENDAR

August

18-20 *Appalachian Gas Measurement Short Course,* Morgantown, W. Va.

September

8-10 *Mid-West Gas School and Conference,* Ames, Iowa.

10-12 *Pacific Coast Gas Assn.* Annual Convention, Del Monte, Calif., Hotel Del Monte.

October

6-10 *National Safety Congress and Exposition,* Chicago, Ill.

20-22 *American Gas Assn. 25th Annual Convention,* Atlantic City, N. J.

Priorities Not to Affect Gas Range Production

There is little likelihood of any shortage in the production of modern gas ranges because of defense priorities during 1941, according to the American Gas Association. In fact, it is anticipated that sales for this year will far exceed the 1940 total of approximately 1,743,000 units which topped the former peak year of 1929.

Manufacturers of gas ranges report that despite factory expansion to meet last year's stepped-up production, and the expectation that 1941 will show a record high in sales, they are obliged to work extra shifts to fill on schedule the volume of orders that are now pouring in as a result of the consumer rush to buy. Should any future shortage of materials limit production of gas ranges during the remaining months of this year, the output still will be ahead of that of any previous year. Of the nation's 34,772,673 occupied dwellings, 17,500,000 are equipped with gas ranges, the number steadily increasing each year.

Heimbach Wins Five Display Awards

In a national contest which was a feature of the annual convention of the International Association of Display Men held at Chicago recently, Roy Heimbach, superintendent of displays for the Michigan Consolidated Gas Company, received a total of five awards in the Utility Division. His honors included two gold first awards, one silver second, and two bronze thirds.

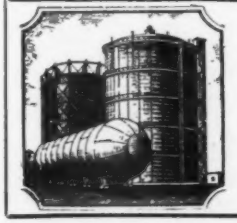
Roy Heimbach, superintendent of displays, Michigan Consolidated Gas Company, Detroit, is congratulated by Newell E. Loomis, salesmanager of the Detroit company, on the fine displays which won him two firsts, a second, and two thirds in the utility division of a national display contest staged by International Association of Display Men at Chicago.

The displays which won these honors for Mr. Heimbach were windows and interior displays for sales floors and special exhibits.

Mr. Heimbach, whose responsibilities include window displays and sales floors of the main office and nine branch offices of the Michigan Consolidated Gas Company, Detroit, is a veteran of seventeen years association with the Company.

Pittsburgh Equitable Meter Company Acquires Larsson Machine Tool Works

President W. F. Rockwell of the Pittsburgh Equitable Meter Company announces that his firm has acquired the assets of the Larsson Machine Tool Works of Berkeley, California. This acquisition provides the Pittsburgh firm with a modern self contained tool plant fully equipped to manufacture dies, tools and special equipment. It was stated that the present business would be continued and that these additional facilities would also be utilized for experimental work on a number of new products which are under development.



STACEY BROTHERS

Gas Construction Co., Inc.

"STACEY-KLONNE" & TELESCOPIC GAS HOLDERS "STACEY BULLET" PRESSURE HOLDERS
PURIFIERS AND STEEL PLATE CONSTRUCTION

Executive Offices:
Cincinnati, Ohio

Eastern Office:
21 West St., N. Y. C.

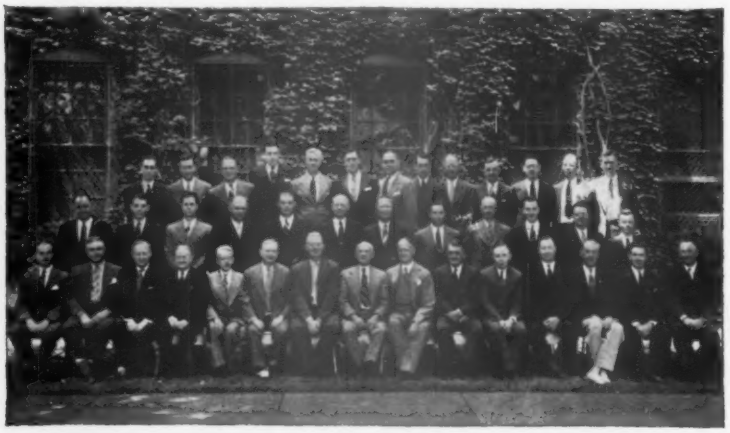
Silver Anniversary of Francis H. Payne, American Meter President

In celebration of his fiftieth anniversary with American Meter Company, Francis H. Payne was tendered a surprise testimonial on June 20th at the Kahkwa Club in Erie, Pa.

From the company's factories and sales offices all over the country, forty-six of its officers and members gathered to honor the man who not only is President of American Meter Company but has an unbroken record of half-a-century as Manager of its important Metric Metal Works.

In memory of the occasion a fine old antique grandfather's clock was given him, the presentation being made by Mr. Norton McKean, Vice President of the company and Manager of its D. McDonald & Co. Works in Albany, N. Y. Mr. McKean himself has been with the company since 1913.

Mr. McKean makes the presentation to Mr. Payne.



Mr. Payne was born into the oil industry on April 1, 1868, at Petroleum Center, Venango County, Pa., where his father, the late Calvin N. Payne, was engaged in drilling for oil, and built the first natural gas pipe line in America.

Francis H. Payne's advent into the gas meter business was in July, 1891, when he became Secretary and Manager of the Metric Metal Company of Beaver Falls, Pa. In the same year, "Metric" built a new factory at Erie and transferred its entire organization to the new location.

A director of American Meter Company for many years prior to his election as Vice President in 1923, Mr. Payne was made President in 1936.

Important manufacturing history in the gas and oil industries has been made by the Metric Metal Works under Mr. Payne's management. Outstanding among these developments have been:

In 1891, 10-B Tinned Steelcase meters. Tin meters made by Metric Metal Works were the first made from dies.

In 1892, Tobey Meters. In 1907, Proportional Meters. In 1910, Ironcase "A" Meters and Volume and Pressure Gages. In 1916, Ironcase "5-B" Meters and Ballard Westcott Orifice Meters. In 1931, Base Pressure Indexes.

In addition, "Classic" ranges and heaters were made by Metric Metal Works between 1892 and 1898; and during the previous world war, the factory produced connections for the Mine Barrage of the North Sea, airplane bolts, incendiary bullets, depth bombs, and numerous parts for the Newport Navy Yard.

INDUSTRIAL GAS BOILERS
GARMENT PRESS BOILERS
100 lbs. ASME Code
¾ to 45 H.P.

P. M. LATTNER MFG. CO.
MAIN OFFICE
CEDAR RAPIDS, IOWA

New 10 Million Foot Gas Holder for Los Angeles

The Southern California Gas Company has awarded a contract to the Bartlett Hayward division of Koppers Company for the design and construction of a 10,000,000 cubic foot gas holder at its plant in Los Angeles.

The holder will rise 190 feet above ground, will be 273 feet in diameter and will consist of five lifts operating from a pit 38 feet deep.

Construction will be speeded due to national defense demands for additional gas by shipyards and aircraft plants in Los Angeles and vicinity. The holder is expected to be ready for operation early in January, 1942.

Due to the priority demands for heavy steel in the national emergency, Bartlett Hayward has designed a concrete pit which will be constructed instead of a steel tank which requires steel plates up to two inches thick.

Foxboro Company Adds to New England Sales Force

The extraordinary industrial activity in New England has greatly increased the demands upon the sales engineers of The Foxboro Company and has resulted in recent additions to the force. Mr. Elmer E. Forslind, a graduate of Northeastern University and for several years in various branches of public utility engineering, has joined The Foxboro Company and will be attached to the New England Office, at Foxboro, Mass. Mr. William Wallace Nelson who, for the past four years has been a Foxboro service engineer, has been transferred to the New England sales force. Mr. Nelson is a graduate of Tufts College, with special engineering training from Boston University.

Servel Inc. Acquires Gas Appliance Division of American Bosch Corporation

Servel, Inc., Evansville, Ind., has purchased the Gas Appliance Division of the American Bosch Corporation, according to an announcement by Louis Ruthenburg, president of Servel, Inc.

The purchase includes all of the facilities now located at Springfield, Mass., for the manufacture of gas water heaters. These facilities are being moved to Evansville.

In addition to building water heaters of the present American Bosch design, Servel intends eventually to further develop and improve this already excellent line of water heaters.

Servel Residential Air Conditioning Unit

A new means of increasing the gas load over a twelve-month-period and opening a new avenue in selling the modernity of gas, has been made possible by Servel, Inc. which announces that it has developed an all year-round residential gas-operated air conditioning unit that heats in winter and cools in summer in one simple compact unit.

The new conditioner goes a step further than either house heating or summer cooling by providing both services from one unit rather than two separate units. Gas is used as the source of energy. It performs six major functions: effective cooling, positive dehumidification, efficient heating, controlled humidification, selective air circulation and thorough air cleaning.

The unit is so flexible it can heat and cool in the same day to meet sudden weather changes. Credit for this versatility goes to the Selectrol, a combination thermostat and unified control system, which by the flick of a switch automatically changes the unit from heating to cooling or vice versa. Even the circulating fan may be operated independently, if desired, from the Selectrol.

Residential air conditioning for summer and winter opens a virgin market for the gas industry as electric utilities, generally speaking, have discouraged compression refrigeration for air conditioning in this particular field as they found the load factor undesirable and distribution facilities for the horsepower requirements inadequate.

The gas industry, on the other hand, has made a definite bid to increase its load through house heating building-up stores of information and experience which will facilitate its entrance into the year-round gas air conditioning field.

In developing the new conditioner several years of exhaustive research in the Servel laboratories in Evansville, Ind., were required. When the unit passed the laboratory stage it went through a series of sales tests and research in the field. This final stage in the development of the conditioner has shown that it does operate effectively.

Silence of operation was a paramount objective in the building of the all-year unit. The refrigeration system uses the same absorption principle of no moving parts as used in the Servel Electrolux refrigerator and has the same benefits as the domestic refrigerator of continued silence, economy of operation and comparative freedom from repair. The indirect heating system is also inherently silent and the centrifugal fan used for air circulation was selected for its quiet operation.

To assure safe operation, water, the safest of all liquids, was selected for both the heating and refrigerating processes. The refrigerating system operates below atmospheric pressure and the steam generator operates at atmospheric steam pressure with an open vent, with the result there is nothing to create or cause a hazard.

An installation in El Centro, Calif., called the hottest inhabited place in the United States, recently maintained a steady cool comfort in the home when the outside temperature ranged as high as 109 degrees for an extended period.

"Through the cooperation of gas utilities in the country we have been able to place units in representative localities to get a cross analysis of its performance under weather extremes of all kinds," Mr. Knighton, manager of the Air Conditioning Department, said.

"Through the aid of the utilities who helped us keep regular performance checks on the unit we have been able to eliminate 'bugs' and bring the operation to almost perfect working conditions.

"Valuable sales information has also been gathered from these companies which is being compiled into a portfolio for use when full production is scheduled."

Because of the manufacturing problems entailed in launching the new unit production on it has been restricted for the time being. For present production requirements a special plant has been built so that manufacturing processes may also be studied until such time as mass production on a large scale is required.

McNair Appointed Vice President and General Manager of Standard Gas Equipment Co.

W. Frank Roberts, President of Standard Gas Equipment Corporation, recently announced the appointment of John W. McNair as Vice President and General Manager of this Company.

Mr. McNair is a graduate of the Carnegie Institute of Technology. Soon after graduating, he went with the Westinghouse Electric & Manufacturing Company, and was with them continuously for the past twelve years in various capacities, both in their Sales and Operating Divisions. For four of these years he was located at the Mansfield and East Springfield Plants of Westinghouse where household appliances such as refrigerators, electric ranges, vacuum cleaners and other household appliances are manufactured. For the past two years he was Assistant Division Manager of the Baltimore Plant of Westinghouse, where military radio apparatus is being manufactured in large quantities.

Mr. McNair brings to Standard Gas Equipment Corporation and the Gas Industry a wealth of experience in the manufacturing and selling of household appliances.

FRANK H. ADAMS

Adams Elected President

Frank H. Adams, for 15 years vice president and general manager of Surface Combustion Corporation, Toledo, O., has been elected president succeeding Henry L. Doherty, deceased.

Capt. A. E. Higgins of Pittsburgh Equitable is Still Very Much Alive

"The reports of my death were greatly exaggerated." So, in the words of Mark Twain, stated Captain A. E. Higgins, the flying Vice President of the Pittsburgh Equitable Meter Company. It was all caused by a syndicated newspaper report of an airplane crash in which a pilot of the same name figured. The wires leading into the Pittsburgh firm were jammed with inquiries from many anxious friends, following publication of the misleading item.

For the records, it might be stated that Captain Higgins, a veteran aviator, who has piloted his own plane, without incident, on three round trips, coast to coast, since the first of this year, is still very much alive today. He recently ferried Colonel W. F. Rockwell, President of the Pittsburgh Equitable Meter Company, to and from the American Water Works Association Convention in Toronto.

The Reliable Shut-Off for Street Mains

THE GOODMAN STOPPER

Now has the "Z" handle for easy manipulation. When locked in place it holds. Stopper cannot slip. Gas cannot pass. Adjusted in 30 seconds.

Ask for circulars on this and other distribution equipment.

Nearly a half century of service to the Gas Industry.

Safety Gas Main Stopper Co.
523 Atlantic Avenue. Brooklyn. New York

Home Service Conference

A "Refresher" course in home service work and home economics training constituted the description of the program given to delegates in attendance at the Home Service Conference held in Syracuse, New York, July 7 and 8.

Elizabeth Sweeney, an instructor in the department and formerly Chairman of the A.G.A. Home Service Committee at the time of her connection with the Empire Gas and Electric Company in New York, was in charge of the program which, because it was given during the first two days of the summer session, included talks presented by many members of the faculty of the college. There was a large attendance of home service people and representatives of food and equipment companies. The two getting credit for coming the greatest distance were Mary Alice Crosson of the West Texas Gas Company at Lubbock and Mildred Clark of the Oklahoma Natural Gas Company at Tulsa.

The highlight of the conference was the presentation of the prize winning CP range demonstration presented by the winning contestant, Jeannette Campbell of the Minneapolis Gas Light Company. This skit was presented in the home service auditorium of the Central New York Power Corporation at Syracuse, with arrangements set up by Margaret Burlingame, home service director. Miss Campbell's presentation made a deep impression on those in attendance, and all agreed that the judges had correctly placed the award.

One part of the program which the delegates particularly enjoyed was the series of group discussions where people joined groups according to the work of their own departments—a one girl department with the discussion led by Ruth Bush of the Michigan Consolidated Gas Company at Ann Arbor; a district system in charge of Mildred Clark, Oklahoma Natural Gas Company at Tulsa; and the city system led by Mrs. Lyda Flanders of the Worcester Gas Light Company at Worcester, Massachusetts. The discussion leaders reported the results of the conference in the general sessions. A subject that appeared frequently in the discussion was the place of home service in the programs of nutrition in National Defense, and Mrs. Flanders introduced Inez Somers of the Consumers' Gas Company of Toronto who outlined the program of home service in Toronto during war time.

At the dinner meeting held at the Drumlins Country Club at Syracuse, Helen Smith of Rochester presided as Toastmistress. She read a telegram of greeting from Albertine Berry, Chairman of the Home Service Committee and introduced four past chairmen of the Home Service Committee, who in turn introduced the people at their tables. The 1928 Chairman was Mrs. Marjorie Wardman of the Long Island Lighting Company, but at the time of her chairmanship she was with the Brooklyn Borough Gas Company at Coney Island; the 1930 Chairman presented was Ruth Soule of The Brooklyn Union Gas Company; the 1937 Chairman, Elizabeth Sweeney; and the 1938 Chairman, Mildred Clark.

Dr. Annie Louise MacLeod, Dean of the College of Home Economics, in extending the hospitality of the College, pointed out her appreciation of the cooperation of the home service departments in setting up the Home Service Course at Syracuse University.

Nomination of Officers for Pacific Coast Gas Assn.

The General Nominating Committee announces that it will make the following nominations at the annual meeting at Del Monte in September:

For President—R. S. Fuller, Engineer of Operation, Pacific Gas and Electric Company.

For Vice-President—F. M. Banks, Vice-President, Southern California Gas Company.

For Treasurer—D. G. Martin, General Auditor, Pacific Gas and Electric Company.

For Directors (2 year term):

O. R. Doerr, General Sales Manager, Pacific Gas and Electric Company.

F. A. Hough, Distribution Engineer, Southern Counties Gas Company.

C. O. Menig, Vice-President, Pacific Gas Radiator Company.

D. H. Perkins, Supt. of Gas Department, San Diego Gas and Electric Company.

Safety Valves for School Building Protection

As an important step in the civilian defense program every school building in Los Angeles is now protected against gas explosions that might occur from bombing, sabotage, earthquake or any other shock. Installation has been completed, under an emergency program of shock-operated gas shut-off valves. All the valves are also being completed with diaphragm control, to close the gas supply whenever pressure passes predetermined high or low levels. Los Angeles is the first large city in the United States to complete this program of school protection, although installations are now being made in many communities.

Civilian defense and fire prevention officials throughout the country have recommended all possible precautions against the possibility of sabotage through gas explosions, as well as prevention of fire damage in the event of any catastrophe. Careful studies of fire damage in English cities has shown the importance of automatic control of gas supplies.

The California State Architectural Division has recommended the installation of automatic gas shut-off valves in all buildings of public assembly.

Hainsworth Elected to Industrial Research Institute

Dr. W. R. Hainsworth, vice-president in charge of research for Servel, Inc., was elected to a three year term as a member of the executive committee of the Industrial Research Institute at the third annual meeting of the Institute held in Pittsburgh, Pa.

The Industrial Research Institute, an affiliate of the National Research Council, was organized three years ago to provide an agency for the study of research organization and management in industry, rather than technical problems.

The membership is composed of industrial concerns maintaining research laboratories as a part of their organization. The chief executive in charge of the member companies represent them in the activities of the Institute. It has its headquarters in Chicago.

Connelly Photographic Contest

Vernon G. Leach, Chief Combustion Engineer of the Peabody Coal Company, Chicago, one of the judges for the Connelly Photographic Contest for gas company employees, has just been awarded First Grand Prize in the Marshall Field Photographic Salon, which was held in Chicago starting June 14th.

This Salon is one of the outstanding amateur photographic classics in the country, and the first grand prize is a signal award eagerly coveted by amateur picture-takers all over the land. The rules governing this award permit the amateur contestants to have professionals do the finishing of the prints they submit. This ruling makes Leach's success all the more impressive, inasmuch as he did 100% of the work on the prize-winning picture himself, one of the few instances in the history of this award that the winning picture has been entirely an amateur product.

Corrosion Resistant

Roxalin Flexible Lacquer Company, Elizabeth, N. J., claim that "Roxaprene," their corrosion resistant speed synthetic, provides superior protection as compared to galvanized metal, at a fraction of the processing cost.

They further state that "when immersed in 2% caustic solution, unpainted hot dip galvanized steel shows corrosion in as short a time as 50 hours, whereas Roxaprene coated steel is unaffected at the end of 600 hours. Roxaprene showed signs of failure only after 96 hours in the same dilute hydrochloric acid solution that ate through galvanized coatings in 2½ hours."

It is applied like the paint finishes in general use (by dip, spray, or roller coat) and requires no special equipment; it air dries quickly or may be forced dried in 50% of the time required by conventional synthetics.

Foxboro Announces Appointment To New York Office Staff

The Foxboro Company, of Foxboro, Mass., announces that Mr. Frank Revell has joined the staff of sales engineers attached to the company's New York office. For the past five years, Mr. Revell has been employed in the Instrument Maintenance Department of the Calco Chemical Company.

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Tar De-emulsifier For Sale

One used tar pressure de-emulsifier in good condition. Capacity 1400 gallons per batch. Address Box No. 120, c/o American Gas Journal, 53 Park Place, New York City.

A Book for Gas Appliance Salesmen

Domestic Gas Appliances by A. M. Apmann. Gives practical working knowledge of the technology of appliances and characteristics of fuels. Ranges, Water Heaters, House Heating and Refrigeration are fully discussed. 238 pages, many illustrations, stiff cover. Special close-out price, 50c. American Gas Journal, 53 Park Place, New York.

Catalogs

Industrial Equipment. National Machine Works, 122 So. Michigan Ave., Chicago, has issued a handsome and useful catalog in loose leaf form with standard 3 ring binder and stiff cover. Bulletins included cover proportional mixers, high pressure inspirators, burners and burner tips, immersion and air heaters, blowers and various accessories. Effective use is made of two colors throughout the bulletins included. Capacities and specifications of equipment are well set forth in charts, tables and text.

Furnace Pressure Controls—To describe important new features of their Furnace Pressure Control system, which has just been extensively redesigned, the Leeds & Northrup Company has issued a 12-page catalog—"Furnace Pressure Control for Metallurgical and Other Industrial Furnaces."

Fully illustrated, this booklet presents for the first time an industrial furnace pressure controller which has its mechanism housed in a flush-mounting, instrument-type case . . . with a built-in selector switch, push-button station and handy control-setting device. The catalog shows features said to enable the user to obtain exactly the sensitivity his particular furnace conditions require.

For a copy of this Catalog N-01A-600 address Leeds & Northrup Company, 4934 Stenton Avenue, Philadelphia, Penna.

Blowers and Gas Pumps Bulletin VA-102 issued by Roots-Connersville Blower Corp. of Connersville, Ind., covers applications of their Victor-Acme blowers and gas pumps for use with a wide variety of oil and gas fired units.

This six-page folder in two colors is rather profusely illustrated, showing several typical applications. It also contains a comparative curve plate showing the advantages of the rotary positive type, as claimed by the manufacturer. A cross-sectional view of these two-impeller machines, and characteristic of both the blowers and gas pumps, is shown along with illustrations of the driving arrangements which are available.

Roots-Connersville blowers and gas pumps are standard features of the equipment built by many firms specializing in combustion, such as industrial furnaces, ovens, forges, heating systems, etc.

Gas Regulators: Five new bulletins on gas regulators have been issued by Reliance Regulator Corporation, Alhambra, California. No. 37-A covers new developments in Pilot Types; Nos. 38-B and 41-B show improvements in regulators for house or service installations; No. 48-A presents high pressure regulators and No. 40-A introduces new models for the control of liquid petroleum gases.

Protective Coatings. Bulletin 8 of Wailes Dove-Hermiston Corporation describes their stack paint for resisting high temperatures. It also devotes considerable attention to hot applied Bitumastic Enamels for buried tanks and pipe lines. Copy to be had by writing the company at Westfield, New Jersey.

Gas House Heating

(Continued from page 13)

imum operating efficiency.

It is the writer's opinion that this method of heating is well worth intensive study and extensive research work. It seems to hold such fine prospects and promise for the ever increasing use of gas for heating service.

Research is Necessary

I trust, that by this time, I have made my ideas clear. It is my belief, that it is only through intensive research and through conscientious and thorough experimentation that we may be able to devise new methods for applying gas fuel in the most efficient manner for the heating of homes.

There is a most worthwhile further field for research in the matter of constructing the homes that are to be heated with gas. If we can build them so as to reduce the amount of heat lost by radiation, through walls, through windows, through cellars and roofs, we likewise reduce the amount of fuel required to maintain comfort in winter and likewise comfort in summer.

Validity of Gas Contracts

(Continued from page 34)

ft. After expiration of several months, the seller sued the gas corporation to recover an additional two cents per 1000 cu. ft. because the gas corporation had extracted gasoline from the gas. The seller contended that he was entitled to this additional payment of two cents per 1000 cu. ft. of gas because the contract did not specifically include the gasoline therein.

However, the higher court held that a purchaser of natural gas is entitled to receive the gas, including the by-products therein. This higher court said:

"Gas means natural gas as it is taken from the earth, including any gasoline content it may have. . . . The district judge was right in holding that he could not add to the claim for that full value, another claim for two cents per 1000 cu. ft. more, because the purchaser of the gas had extracted gasoline from it."

On the other hand, a contract may be valid by the terms of which a seller of natural gas may be entitled to receive an additional payment for gasoline, or other product, extracted therefrom. However, a contract of this nature must not merely sell gas at a stipulated price per 1000 ft. but it must contain a clause which indicates that the intentions of both parties, at the time the contract was made, was that the purchaser should receive additional payments.

For example, in Coyle, 144 So. 739, the court said:

"If its gasoline content is not regarded as included in the gas within the meaning of the contract, then, obviously, defendant (purchaser) is not entitled to it, or any part of it. If it is so regarded, then one-eighth of it is due plaintiff (seller) by virtue of the agreement."

Oil Transportation

(Continued from page 16)

nals and shipping ports changed all that, for Britain was forced to transfer its ports to harbors not served by rail and available only by truck.

British women are driving trucks today, and trucks are carrying Britain's war goods with an efficiency of service which only the trucks can render under emergent conditions. The cargoes may not be so large as carried by rail, but they have a habit of arriving, however devious the route, and reasonably on time.

Stories seeping out of Britain tell of the operation of these war-time motor trucks, traveling in darkness and invisible to planes, taking such routes as seem best at the moment, changing routes as changing conditions demand, and delivering the goods right on the spot where they are needed.

Koppers Promotions

Two promotions in the Engineering and Construction Division have been announced by Joseph Becker, vice president of Koppers Company and general manager of that division.

G. M. Carvlin has been appointed assistant vice president and W. L. Gable has been named sales manager for the division. Both formerly were sales engineers.

Mr. Carvlin joined Koppers in 1925 as a member of the research department. He later entered the operating department, from where he was promoted to sales engineer in the sales department.

Mr. Gable entered the Koppers engineering department in 1916. He later was successively chief draftsman, engineer and sales engineer.

Servel Sales Convention

Servel, Inc., will hold its annual sales convention October 9 to October 12 at French Lick Springs, Indiana, it was announced by George S. Jones, Jr., vice-president and general sales manager.

Meetings will be attended by over 200 sales representatives, officials and executives of the company. Servel's main office and factory are located in Evansville, Ind.

Flow Meters

"Flow Meters by Cochrane" has grown to a 52-page handbook of instrument application to steam; water; air; gas; and viscous, volatile, and corrosive fluid measurement.

The construction features of the friction-free electric flow meter and the high-torque mechanical flow meter are explained in great detail with full-size illustrations.

Special sections are devoted to control applications, dual range recorders, detached instruments, and summation meters.

For a copy of this new Flow Meter book, write Cochrane Corporation, 17th Street and Allegheny Avenue, Philadelphia, Pa.

MEREDITH N. BAILEY

Mr. Meredith N. Bailey, who has been active in the Gas Industry during the past thirty years, died in his sixty-second year, after a brief illness, at 7:30 P. M., July 24th, at his home, Seventh Avenue and Oak Street, in Royersford, Pa.

Mr. Bailey was born on April 25, 1880 at Cape May, N. J., and is survived by his wife, Mrs. Linda R. Bailey, and his daughter, Mrs. Mary B. Koch.

Meredith N. Bailey

He was educated at the Cape May High School and at Deats Academy, Cape May, N. J. Before joining the Keystone Meter Company of Royersford on July 1, 1909, he worked for several years in the Plant and Engineering Department of the Bell Telephone Company in Pennsylvania.

When the Keystone organization was absorbed by American Meter Company in 1916, Mr. Bailey continued his long career as a successful "Supplier" of gas meters, representing his company with headquarters at the 1513 Race Street factory in Philadelphia.

He was promoted to become Assistant Manager of American Meter Company's Philadelphia plant April 17, 1935.

Mr. Bailey was an active member of the Royersford Chamber of Commerce.

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To lay mechanical joint cast iron pipe does not require trained men whose skill may be needed for National Defense. The mechanical joints made by CIPRA members are both fool-proof and leak-proof. They can be installed easily and quickly by inexperienced men. Based on a simple and time-tested principle, these joints are bottle-tight under all working pressures.

Look for the "U-Stock" registered trade mark. Cast iron pipe is made in diameters from 1½ to 84 inches.

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Sprague's complete line of gas regulation and measurement equipment is your insurance for better performance. Precision construction, simplicity in design, interchangeability and safety are Sprague policies and ones which Engineers recognize today when streamlining their installations. For domestic or industrial use, Sprague is equipped to furnish your every need.

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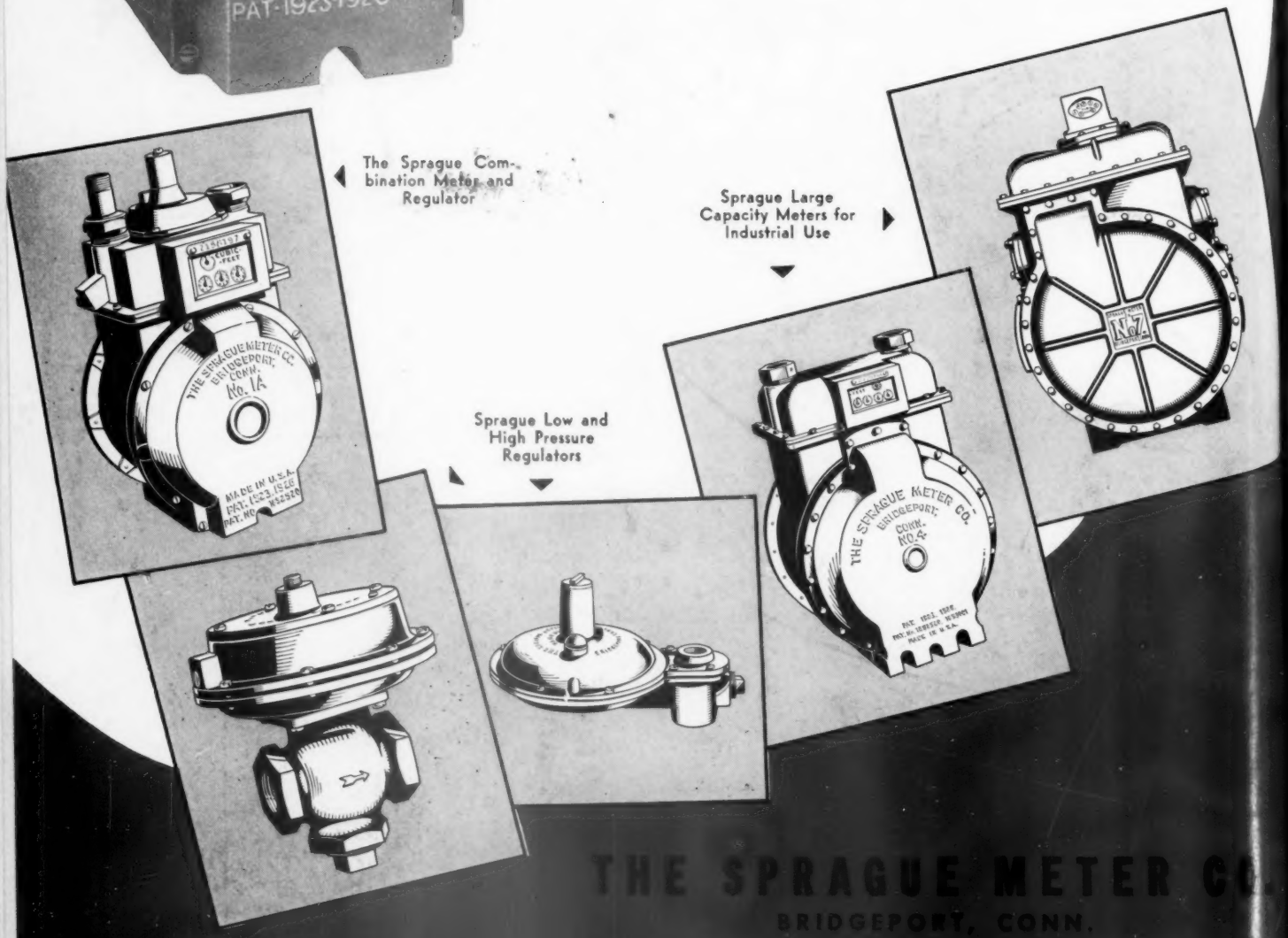

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